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Rec'd PCT/PTO 24 AUG 2001

FORM PTO-1390
(REV. 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

5/1252

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/914323

INTERNATIONAL APPLICATION NO.

PCT/EP00/01496

INTERNATIONAL FILING DATE

24/02/2000

PRIORITY DATE CLAIMED

27/02/1999

TITLE OF INVENTION Bicyclic heterocycles, pharmaceutical compositions containing these compounds, their use and processes for preparing them

APPLICANT(S) FOR DO/EO/US

Himmelsbach, F. et al

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☐ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A **FIRST** preliminary amendment.
14. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information:
Initial Information Data Sheet
Certified Priority Documents: US 60/149,329, filed 17/08/1999; DE 199 08 567.6, filed 27/02/1999;
DE 199 11 366.1, filed 15/03/1999; DE 199 28 306.0; filed 21/06/1999; DE 199 54 816.1, filed
13/11/1999

U.S. APPLICATION NO. 09/914323 <small>(known as 37 CFR 1.5)</small>		INTERNATIONAL APPLICATION NO PCT/EP00/01496		ATTORNEY'S DOCKET NUMBER 5/1252	
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21. <input type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO..... \$1000.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$860.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$690.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =				CALCULATIONS PTO USE ONLY	
				\$	860.00
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input checked="" type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$	130.00
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	\$	
Total claims	52 - 20 =	32	x \$18.00	\$	576.00
Independent claims	4 - 3 =	1	x \$80.00	\$	80.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)				\$	270.00
TOTAL OF ABOVE CALCULATIONS =				\$	1,916.00
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$	0.00
SUBTOTAL =				\$	1,916.00
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	0.00
TOTAL NATIONAL FEE =				\$	1,916.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$	0.00
TOTAL FEES ENCLOSED =				\$	1,916.00
				Amount to be refunded:	\$
				charged:	\$

a. ☐ A check in the amount of \$ _____ to cover the above fees is enclosed.

b. ☒ Please charge my Deposit Account No. 02-2955 in the amount of \$ _____ to cover the above fees.
 A duplicate copy of this sheet is enclosed.

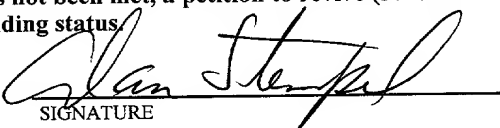
c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
 overpayment to Deposit Account No. 02-2955. A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card
 information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR
 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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 Alan R. Stempel 08/24/2001
 NAME
 28,991
 REGISTRATION NUMBER

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

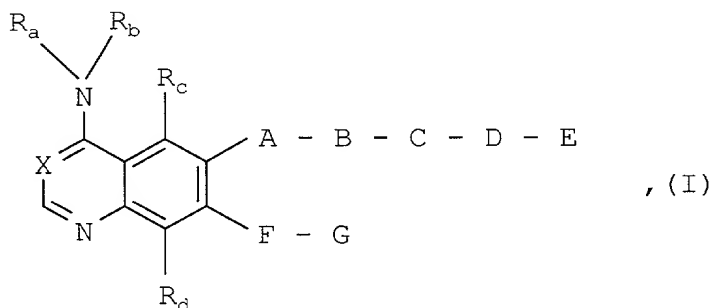
Application of: Himmelsbach et al.
 International Application No.: PCT/EP00/01496
 International Filing Date: 24 February 2000 (24.02.00)
 Title: 4-AMINO-QUINAZOLINE AND QUINOLINE
 DERIVATIVES HAVING AN INHIBITORY EFFECT
 ON SIGNAL TRANSDUCTION MEDIATED BY
 TYROSINE KINASES
 Docket No.: 5/1252

Box PCT
 Commissioner of Patents
 Washington, D.C. 20231

CLAIM MARK-UP

(enclosure to Preliminary Amendment)

1. (amended) Bicyclic heterocycles of general A compound of the formula



wherein

R_a denotes a hydrogen atom or a C₁₋₄-alkyl group,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, whilst

INITIAL INFORMATION DATA SHEET

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PATENT TRADEMARK OFFICE

Application Information:

Title Line One:	4-Amino-Quinazoline and Quinoline
Title Line Two:	Derivatives Having an Inhibitory Effect on
Title Line Three:	Signal Transduction Mediated By Tyrosine
Title Line Four:	Kinases
Total Drawing Sheets:	0
Formal Drawings?:	No
Application Type:	Utility
Docket No.:	5/1252

Continuity Information:

This application is a:	371 of
International Application:	PCT/EP00/01496
International Filing Date:	02/24/2000

This application is a:	Non-Provisional of Provisional
>Application One:	60/149,329
Filing Date:	August 17, 1999

09/914323

JCO3 Rec'd PCT/FTO 24 AUG 2001

Prior Foreign Applications:

Foreign Application One: DE 199 08 567.6
Filing Date: 02/27/1999
Country: Germany
Priority Claimed: Yes

Foreign Application Two: DE 199 11 366.1
Filing Date: 03/15/1999
Country: Germany
Priority Claimed: Yes

Foreign Application Three: DE 199 28 306.0
Filing Date: 06/21/1999
Country: Germany
Priority Claimed: Yes

Foreign Application Four: DE 199 54 816.1
Filing Date: 11/13/1999
Country: Germany
Priority Claimed: Yes

R₁ and R₂, which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a C₁₋₄-alkyl, hydroxy, C₁₋₄-alkoxy, C₃₋₆-cycloalkyl, C₄₋₆-cycloalkoxy, C₂₋₅-alkenyl or C₂₋₅-alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a C₃₋₅-alkenyloxy or C₃₋₅-alkynyloxy group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, C₁₋₄-alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C₁₋₄-alkyl groups, wherein the substituents may be identical or different, or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group,

R_c and R_d, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C₁₋₄-alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

D denotes an alkylene, -CO-alkylene or -SO₂-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms and additionally 1 to 4 hydrogen atoms in the alkylene moiety may be replaced by fluorine atoms, while the linking of the -CO-alkylene and -SO₂-alkylene group to the adjacent group C in each case must take place via the carbonyl or sulphonyl group,

a -CO-O-alkylene, -CO-NR₄-alkylene or -SO₂-NR₄-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms, whilst the linking to the adjacent group C in each case must take place via the carbonyl or sulphonyl group, wherein

R₄ denotes a hydrogen atom or a C₁₋₄-alkyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group, which may be substituted by an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, which may be terminally substituted in each case by a C₁₋₆-alkylcarbonylsulphenyl, C₃₋₇-cycloalkylcarbonylsulphenyl, C₃₋₇-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₇-cycloalkylcarbonyloxy, C₃₋₇-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, each of which may be terminally substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered

alkyleneimino groups a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₃₋₇-cycloalkyl or C₃₋₇-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group, which may be substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom or by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₄₋₇-cycloalkyl group optionally substituted by 1 or 2 methyl groups,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₇-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f)-group, whilst

R_e and R_f, which may be identical or different, each denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₇-cycloalkyl, C₁₋₄-alkoxy or C₅₋₇-cycloalkoxy group,

and R₉ denotes a C₁₋₄-alkyl, aryl or aryl-C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which may be substituted by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆OCO or R₆OCO-C₁₋₄-alkyl groups or by an R₆OCO-group and an R₆OCO-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a C₁₋₄-alkyl, formyl, C₁₋₄-alkylcarbonyl or C₁₋₄-alkylsulphonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and additionally at cyclic carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ and R₁₀ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group and additionally at cyclic carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, while the abovementioned 5- to 7-membered rings are additionally substituted in each case at a carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₁₀ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ and R₁₀ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 position in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl or tri- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R_5 is as hereinbefore defined,

an $R_{11}NR_5$ group wherein R_5 is as hereinbefore defined and

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

an amino group or an amino group optionally substituted by 1 or 2 C_{1-4} -alkyl groups wherein the alkyl groups may be identical or different and each alkyl moiety may be substituted from position 2 onward by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, or by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group,

a 4- to 7-membered alkyleneimino group optionally substituted by 1 to 4 methyl groups,

a 6- to 7-membered alkyleneimino group optionally substituted by 1 or 2 methyl groups wherein in each case a methylene group in the 4 position is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , by a sulphinyl or sulphonyl group, whilst R_{10} is as hereinbefore defined,

an imidazolyl group optionally substituted by 1 to 3 methyl groups,

a C_{5-7} -cycloalkyl group wherein a methylene group is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , by a sulphinyl or sulphonyl group, wherein R_{10} is as hereinbefore defined,

or D together with E denotes a hydrogen, fluorine or chlorine atom,

a C_{1-4} -alkyl group optionally substituted by 1 to 5 fluorine atoms,

a C_{3-6} -cycloalkyl group,

an aryl, heteroaryl, C_{1-4} -alkylcarbonyl, arylcarbonyl, carboxy, C_{1-4} -alkoxycarbonyl, $R_gCO-O-(R_eCR_f)-O-CO$, $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ -group wherein R_e to R_g and R_7 to R_9 are as hereinbefore defined,

an aminocarbonyl, C_{1-4} -alkylaminocarbonyl or di- $(C_{1-4}$ -alkyl)-aminocarbonyl group or

a carbonyl group, which is substituted by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , by a sulphinyl or sulphonyl group, while R_{10} is as hereinbefore defined,

F denotes a C_{1-6} -alkylene group, an $-O-C_{1-6}$ -alkylene group, whilst the alkylene moiety is linked to the group G, or an oxygen atom, whilst the latter may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 -group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, wherein R_5 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a hydrogen atom, by a C_{1-4} -alkyl, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, wherein R_6 to R_9 are as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups are each linked to a carbon atom of the group F,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 positions by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl or tri- $(C_{1-4}$ -alkoxy)-methyl group, wherein R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, wherein R_5 is as hereinbefore defined,

a R_hNR_5 -group wherein R_5 is as hereinbefore defined and R_h denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally substituted by one or two methyl groups,

an amino group or an amino group optionally substituted by 1 or 2 C_{1-4} -alkyl groups wherein the alkyl groups may be identical or different and each alkyl moiety may be substituted from position 2 onward by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group,

wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a 4- to 7-membered alkyleneimino group optionally substituted by 1 to 4 methyl groups,

a 6- to 7-membered alkyleneimino group optionally substituted by 1 or 2 methyl groups wherein in each case a methylene group in the 4 position is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, or by a sulphinyl or sulphonyl group, wherein R₁₀ is as hereinbefore defined,

an imidazolyl group optionally substituted by 1 to 3 methyl groups,

a C₅₋₇-cycloalkyl group wherein a methylene group is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, or by a sulphinyl or sulphonyl group, wherein R₁₀ is as hereinbefore defined, or

F and G together denote a hydrogen, fluorine or chlorine atom,

a C₁₋₆-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C₁₋₄-alkoxy group,

a C₁₋₆-alkoxy group which is substituted by an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group, while R₆ to R₉ are as hereinbefore defined,

a C₃₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group, an amino group optionally substituted by 1 or 2 C₁₋₄-alkyl groups,

a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, or by a sulphinyl or sulphonyl group, while R₁₀ is as hereinbefore defined,

with the proviso that at least one of the groups E, G or F together with G denotes an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group or

D together with E contains an R_gCO-O-(R_eCR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino or thiomorpholino group substituted in the 2 position or in the 2 and 6 position by a C₁₋₄-alkoxy group,

a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group or

an optionally substituted 1,3-dioxolan-2-yl, 1,3-dioxan-2-yl, 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl-group or

E contains an optionally substituted 2-oxo-thiomorpholino group or an optionally substituted 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl-group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which may in each case be monosubstituted by R₁₂, mono, di or trisubstituted by R₁₃ or monosubstituted by R₁₂ and additionally mono or disubstituted by R₁₃, wherein the substituents may be identical or different and

R₁₂ denotes a cyano, carboxy, C₁₋₄-alkoxycarbonyl, aminocarbonyl, C₁₋₄-alkylaminocarbonyl, di-(C₁₋₄-alkyl)-aminocarbonyl, C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, hydroxy, C₁₋₄-alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C₁₋₄-alkylamino, di-(C₁₋₄-alkyl)-amino, C₁₋₄-alkyl-carbonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylcarbonylamino, C₁₋₄-alkylsulphonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylsulphonylamino, aminosulphonyl, C₁₋₄-alkylaminosulphonyl or di-(C₁₋₄-alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino-group, and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

and moreover by the heteroaryl groups mentioned in the definitions of the abovementioned groups is meant a 5-membered heteroaromatic group which contains an imino group, an oxygen or sulphur atom or an imino group, an oxygen or sulphur atom and one or two nitrogen atoms, or

a 6-membered heteroaromatic group, which contains one, two or three nitrogen atoms,

whilst the abovementioned 5-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups and the abovementioned 6-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups or by a fluorine, chlorine, bromine or iodine atom, or by a trifluoromethyl, hydroxy, methoxy or ethoxy group,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

2. ~~(amended) Bicyelic heterocycles of general~~ A compound of the formula I according to claim 1, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D denotes an alkylene or -CO-alkylene group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking of the -CO-alkylene group to the adjacent group C in each case must take place via the carbonyl group,

a -CO-O-alkylene or -CO-NR₄-alkylene- group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group wherein

R₄ denotes a hydrogen atom or a methyl or ethyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group which may be substituted by an R₆O-CO group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a hydroxy, C₁₋₄-alkoxy, di-(C₁₋₄-alkyl)amino, C₁₋₆-alkylcarbonylsulphenyl, C₃₋₆-cycloalkylcarbonylsulphenyl, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₆-cycloalkylcarbonyloxy, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

a C₃₋₆-cycloalkyl or C₃₋₆-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group which may be substituted by a hydroxy, C₁₋₄-alkoxy, or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups, in each case a methylene group in the 4 position may be replaced by an oxygen atom or by an N-(C₁₋₂-alkyl)-imino group,

a C₄₋₆-cycloalkyl group,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, while the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₆-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f) group, wherein

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₆-cycloalkyl, C₁₋₄-alkoxy or C₅₋₆-cycloalkoxy group,

and R₉ denotes a C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a methyl or ethyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at cyclic carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ and R₁₀ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group and is additionally substituted at cyclic carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is as hereinbefore defined,

a $R_{11}NR_5$ group wherein R_5 is as hereinbefore defined and

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-

tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl, aryl, $R_g\text{CO-O-(R}_e\text{CR}_f\text{)-O-CO}$ or $(R_7\text{O-PO-OR}_8)$ group wherein R_e to R_g and R_7 and R_8 are as hereinbefore defined,

F denotes an $\text{-O-C}_{1-4}\text{-alkylene}$ group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an $R_6\text{O-CO-alkylene-NR}_5$, $(R_7\text{O-PO-OR}_8)\text{-alkylene-NR}_5$ or $(R_7\text{O-PO-R}_9)\text{-alkylene-NR}_5$ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two $\text{C}_{1-2}\text{-alkyl}$ groups or by an $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group, while R_5 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by an $R_6\text{O-CO}$, $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$ or bis- $(R_6\text{O-CO})\text{-C}_{1-4}\text{-alkyl}$ group wherein R_6 is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$ groups wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an $R_6\text{O-CO}$, $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$ or bis- $(R_6\text{O-CO})\text{-C}_{1-4}\text{-alkyl}$ group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$ groups wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$, bis- $(R_6\text{O-CO})\text{-C}_{1-4}\text{-alkyl}$, $(R_7\text{O-PO-OR}_8)\text{-C}_{1-4}\text{-alkyl}$ or $(R_7\text{O-PO-R}_9)\text{-C}_{1-4}\text{-alkyl}$ group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$ or bis- $(R_6\text{O-CO})\text{-C}_{1-4}\text{-alkyl}$ group and additionally at cyclic carbon atoms by one or two $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$ groups wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an $R_6\text{O-CO}$, $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$ or bis- $(R_6\text{O-CO})\text{-C}_{1-4}\text{-alkyl}$ group wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a C_{1-4} -alkyl or $R_6O-CO-C_{1-4}$ -alkyl group, while R_6 is as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups in each case are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is as hereinbefore defined,

a R_hNR_5 group wherein R_5 is as hereinbefore defined and R_h denotes a substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl,

2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally by one or two methyl groups, or

F and G together denote a hydrogen atom,

a C₁₋₄-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C₁₋₄-alkoxy group,

a C₁₋₄-alkoxy group which is substituted by an R₆O-CO group, where R₆ is as hereinbefore defined, or

a C₄₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group

with the proviso that at least one of the groups E, G or F together with G denotes an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group or

D together with E denotes an R_gCO-O-(R_eCR_f)-O-CO or (R₇O-PO-OR₈) group or

E or G denotes an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a C₁₋₄-alkoxy group,

a di-(C₁₋₄-alkoxy)-methyl group or

an optionally substituted 1,3-dioxolan-2-yl, 1,3-dioxan-2-yl, 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group or

E contains an optionally substituted 2-oxo-thiomorpholino group or an optionally substituted 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may in each case be monosubstituted by R₁₂, mono- or disubstituted by R₁₃ or monosubstituted by R₁₂ and additionally mono- or disubstituted by R₁₃, wherein the substituents may be identical or different and

R₁₂ denotes a cyano, C₁₋₂-alkoxycarbonyl, aminocarbonyl, C₁₋₂-alkylaminocarbonyl, di-(C₁₋₂-alkyl)-aminocarbonyl, C₁₋₂-alkylsulphenyl, C₁₋₂-alkylsulphinyl, C₁₋₂-alkylsulphonyl, hydroxy, nitro, amino, C₁₋₂-alkylamino or di-(C₁₋₂-alkyl)-amino group and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

~~the or a tautomers, the stereoisomers and the or~~ salts thereof.

3. ~~(amended) Bicyclic heterocycles of general~~ A compound of the formula I according to claim 1, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

R₃ denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D denotes a C₁₋₄-alkylene group,

a -CO-NR₄-alkylene group wherein the alkylene moiety contains 2 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group, wherein

R₄ denotes a hydrogen atom,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while

R_5 denotes a hydrogen atom,

a C_{1-4} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a C_{1-4} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or arylmethylcarbonylsulphenyl group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a hydroxy, C_{1-4} -alkylcarbonyloxy, arylcarbonyloxy or arylmethylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

a C_{3-6} -cycloalkyl or C_{3-6} -cycloalkyl-methyl group,

R_6 , R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom,

a C_{1-8} -alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

an aryl, arylmethyl or $R_gCO-O-(R_eCR_f)$ group, while

R_e denotes a hydrogen atom or a C_{1-4} -alkyl group,

R_f denotes a hydrogen atom and

R_g denotes a C_{1-4} -alkyl, cyclopentyl, cyclohexyl, C_{1-4} -alkoxy, cyclopentyloxy or cyclohexyloxy group,

and R_9 denotes a methyl or ethyl group,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, wherein R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-2}$ -alkyl group and is additionally substituted at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined,

a piperidiny1 group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 or 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 , 1,3-dioxolan-2-yl-methyl- NR_5 or 1,3-dioxan-2-yl-methyl- NR_5 group wherein R_5 is as hereinbefore defined,

a N-methyl- $R_{11}N$ or N-ethyl- $R_{11}N$ group wherein

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl, aryl, $R_g\text{CO-O-(R}_e\text{CR}_f\text{)-O-CO}$ or $(R_7\text{O-PO-OR}_8)$ group wherein R_e to R_g and R_7 and R_8 are as hereinbefore defined,

F denotes an $\text{-O-C}_{1-4}\text{-alkylene}$ group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an $R_6\text{O-CO-alkylene-NR}_5$ group wherein the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two $\text{C}_{1-2}\text{-alkyl}$ groups or by an $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group, while R_5 and R_6 are as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by an $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an $R_6\text{O-CO}$, or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group, while R_6 and R_{10} are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$, bis- $(R_6\text{O-CO})\text{-C}_{1-4}\text{-alkyl}$ or $(R_7\text{O-PO-OR}_8)\text{-C}_{1-2}\text{-alkyl}$ group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group and additionally at a cyclic carbon atom by an $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group, while R_6 is as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$, bis- $(R_6\text{O-CO})\text{-C}_{1-4}\text{-alkyl}$ or $(R_7\text{O-PO-OR}_8)\text{-C}_{1-2}\text{-alkyl}$ group wherein R_6 to R_8 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a methyl, ethyl or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group, while R_6 is as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups are each linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl-NR₅, 2,2-diethoxyethyl-NR₅, 1,3-dioxolan-2-yl-methyl-NR₅ or 1,3-dioxan-2-yl-methyl-NR₅- group or

F and G together denote a hydrogen atom,

a methoxy or ethoxy group,

a C₁₋₃-alkoxy group which is substituted by an R₆O-CO group, while R₆ is as hereinbefore defined,

a C₄₋₆-cycloalkoxy or C₃₋₆-cycloalkyl-C₁₋₃-alkoxy group

with the proviso that at least one of the groups E, G or F together with G denotes an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group or

D together with E denotes an R_gCO-O-(R_eCR_f)-O-CO or (R₇O-PO-OR₈) group or

E or G denote an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxymethyl or 2,2-diethoxymethyl group or

an optionally substituted 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl- group or

E contains an optionally substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-thiomorpholino, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R₁₃, while the substituents may be identical or different and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-4} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

4. ~~(amended) Bicyclic heterocycles of general~~ A compound of the formula I according to claim 1, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

R_c and R_d each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D denotes a C_{1-4} -alkylene group,

a $-CO-NR_4$ -alkylene group wherein the alkylene moiety contains 2 or 3 carbon atoms, while the linking to the adjacent group C must take place via the carbonyl group wherein

R_4 denotes a hydrogen atom,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene- NR_5 or $(R_7O-PO-OR_8)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while

R_5 denotes a hydrogen atom,

a C₁₋₂-alkyl group which may be substituted by an R₆O-CO group,

an ethyl group optionally substituted by one or two methyl groups, which is terminally substituted by a hydroxy, C₁₋₂-alkylcarbonylsulphenyl or C₁₋₂-alkylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

R₆ denotes a hydrogen atom,

a C₁₋₈-alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

a phenyl group optionally substituted by one or two methyl groups, a phenylmethyl group which may be substituted in the phenyl moiety by one or two methyl groups, a 5-indanyl group or an R_gCO-O-(R_eCR_f) group, while

R_e denotes a hydrogen atom or a methyl group,

R_f denotes a hydrogen atom and

R_g denotes a C₁₋₄-alkyl or C₁₋₂-alkoxy group,

R₇ and R₈, which may be identical or different, each denote a hydrogen atom, a methyl, ethyl or phenyl group,

a pyrrolidino or piperidino group which is substituted by an R₆O-CO or R₆O-CO-methyl group, wherein R₆ is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R₆O-CO or R₆O-CO-methyl groups wherein R₆ is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO group, while R₆ is as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl or (R₇O-PO-OR₈)-C₁₋₂-alkyl group wherein R₆ to R₈ are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R_6O-CO -methyl group and additionally at a cyclic carbon atom by an R_6O-CO group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO - group, while R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 or 1,3-dioxolan-2-yl-methyl- NR_5 -group wherein R_5 is as hereinbefore defined,

an N-methyl- $R_{11}N$ or N-ethyl- $R_{11}N$ group wherein

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group,

or D together with E denotes a hydrogen atom,

a methyl group or an $R_gCO-O-(R_eCR_f)-O-CO$ group wherein R_e to R_g are as hereinbefore defined,

F denotes a $-O-C_{1-4}$ -alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 group wherein the alkylene moiety, which is straight-chained and contains 1 or 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while R_5 and R_6 are as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or R_6O-CO -methyl group wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or R_6O-CO -methyl groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined, or

F and G together denote a hydrogen atom,

a methoxy or ethoxy group,

a C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group,

with the proviso that at least one of the groups E or G denotes an R_6O-CO or ($R_7O-PO-OR_8$) group or

D together with E denotes an $R_9CO-O-(R_eCR_f)-O-CO$ group or

E contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a methoxy or ethoxy group,

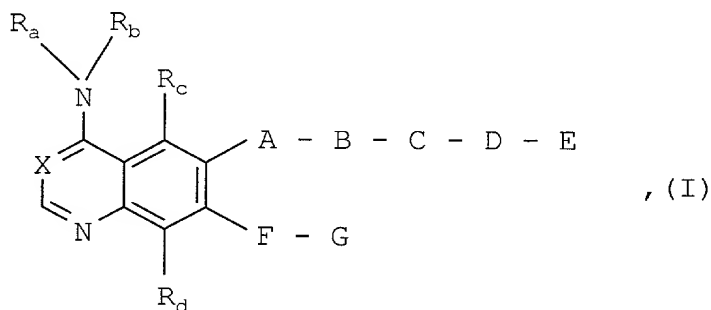
a 2,2-dimethoxymethyl or 2,2-diethoxymethyl group or

a 1,3-dioxolan-2-yl, 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group or

an optionally substituted 2-oxo-thiomorpholino group,

~~the or~~ a tautomers, ~~the stereoisomers and the or~~ salts thereof.

5. ~~(amended) Bicyclic heterocycles~~ A compound of the of general formula



wherein

R_a denotes a hydrogen atom or a C_{1-4} -alkyl group.

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, whilst

R₁ and R₂, which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a C₁₋₄-alkyl, hydroxy, C₁₋₄-alkoxy, C₃₋₆-cycloalkyl, C₄₋₆-cycloalkoxy, C₂₋₅-alkenyl or C₂₋₅-alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a C₃₋₅-alkenyloxy or C₃₋₅-alkynyloxy group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, C₁₋₄-alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C₁₋₄-alkyl groups, wherein the substituents may be identical or different, or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group,

R_c and R_d, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C₁₋₄-alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group.

~~R_a to R_d, A to C and X are defined as in claim 1,~~

D denotes an alkylene, -CO-alkylene or -SO₂-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms and additionally 1 to 4 hydrogen atoms in the alkylene moiety may be replaced by fluorine atoms, whilst the linking of the -CO-alkylene and -SO₂-alkylene group to the adjacent group C in each case must take place via the carbonyl or sulphonyl group,

a -CO-O-alkylene, -CO-NR₄-alkylene or -SO₂-NR₄-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms, whilst the linking to the adjacent group C in each case must take place via the carbonyl or sulphonyl group wherein

R₄ denotes a hydrogen atom or a C₁₋₄-alkyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group, which may be substituted by an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, which may be terminally substituted in each case by a C₁₋₆-alkylcarbonylsulphenyl, C₃₋₇-cycloalkylcarbonylsulphenyl, C₃₋₇-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which may be terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₇-cycloalkylcarbonyloxy, C₃₋₇-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, each of which may be terminally substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₃₋₇-cycloalkyl or C₃₋₇-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group, which may be substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom or by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₄₋₇-cycloalkyl group optionally substituted by 1 or 2 methyl groups,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, wherein the unsaturated part may not be linked to the oxygen atom,

a C₃₋₇-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f)-group, whilst

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₇-cycloalkyl, C₁₋₄-alkoxy or C₅₋₇-cycloalkoxy group,

and R₉ denotes a C₁₋₄-alkyl, aryl or aryl-C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which may be substituted by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆OCO or R₆OCO-C₁₋₄-alkyl groups or by an R₆OCO-group and an R₆OCO-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined and

R_{10} denotes a hydrogen atom, a C_{1-4} -alkyl, formyl, C_{1-4} -alkylcarbonyl or C_{1-4} -alkylsulphonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the abovementioned 5- to 7-membered rings are additionally substituted in each case at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups

or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 positions by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl or tri- $(C_{1-4}$ -alkoxy)-methyl group, whilst R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R_5 is as hereinbefore defined,

an $R_{11}NR_5$ -group wherein R_5 is as hereinbefore defined and

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an $R_gCO-O-(R_eCR_f)-O-CO$, $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ -group wherein R_e to R_g and R_7 to R_9 are as hereinbefore defined,

F and G together denote a hydrogen atom,
a C₁₋₆-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C₁₋₄-alkoxy group,
a C₃₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R₁₂, mono-, di- or trisubstituted by R₁₃ or monosubstituted by R₁₂ and additionally mono- or disubstituted by R₁₃, whilst the substituents may be identical or different and

R₁₂ denotes a cyano, carboxy, C₁₋₄-alkoxycarbonyl, aminocarbonyl, C₁₋₄-alkylaminocarbonyl, di-(C₁₋₄-alkyl)-aminocarbonyl, C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, hydroxy, C₁₋₄-alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C₁₋₄-alkylamino, di-(C₁₋₄-alkyl)-amino, C₁₋₄-alkyl-carbonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylcarbonylamino, C₁₋₄-alkylsulphonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylsulphonylamino, aminosulphonyl, C₁₋₄-alkylaminosulphonyl or di-(C₁₋₄-alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino-group, and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

~~the or a tautomers, the stereoisomers and or the salts thereof.~~

6. (amended) Bicyclic heterocycles of general A compound of the formula I according to claim 5, wherein

~~R_a to R_d, A to C and X are defined as in claim 2, —~~

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D denotes an alkylene or -CO-alkylene group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking of the -CO-alkylene group to the adjacent group C in each case must take place via the carbonyl group,

a -CO-O-alkylene or -CO-NR₄-alkylene- group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group wherein

R₄ denotes a hydrogen atom or a methyl or ethyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group which may be substituted by an R₆O-CO group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a hydroxy, C₁₋₄-alkoxy, di-(C₁₋₄-alkyl)amino, C₁₋₆-alkylcarbonylsulphenyl, C₃₋₆-cycloalkylcarbonylsulphenyl, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₆-cycloalkylcarbonyloxy, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

a C₃₋₆-cycloalkyl or C₃₋₆-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group which may be substituted by a hydroxy, C₁₋₄-alkoxy, or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen atom or by an N-(C₁₋₂-alkyl)-imino group,

a C₄₋₆-cycloalkyl group,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, while the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₆-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f) group, while

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₆-cycloalkyl, C₁₋₄-alkoxy or C₅₋₆-cycloalkoxy group,

and R₉ denotes a C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl or ethyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl, or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is as hereinbefore defined,

a $R_{11}NR_5$ group wherein R_5 is as hereinbefore defined and

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an $R_gCO-O-(R_eCR_f)-O-CO$ or $(R_7O-PO-OR_8)$ group wherein R_e to R_g and R_7 to R_9 are as hereinbefore defined,

F and G together denote a hydrogen atom,

a C_{1-6} -alkoxy group optionally substituted from position 2 by a hydroxy or C_{1-4} -alkoxy group,

a C_{4-7} -cycloalkoxy or C_{3-7} -cycloalkyl- C_{1-4} -alkoxy group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R_{12} , mono- or disubstituted by R_{13} or monosubstituted by R_{12} and additionally mono- or disubstituted by R_{13} , whilst the substituents may be identical or different and

R₁₂ denotes a cyano, C₁₋₂-alkoxycarbonyl, aminocarbonyl, C₁₋₂-alkylaminocarbonyl, di-(C₁₋₂-alkyl)-aminocarbonyl, C₁₋₂-alkylsulphenyl, C₁₋₂-alkylsulphinyl, C₁₋₂-alkylsulphonyl, hydroxy, nitro, amino, C₁₋₂-alkylamino or di-(C₁₋₂-alkyl)-amino, and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

7. ~~(amended) Bicyclic heterocycles of general~~ A compound of the formula I according to claim 5, wherein

~~R_a to R_d, A to C and X are defined as in claim 3,~~

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

R₃ denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D denotes a C₁₋₄-alkylene group,

a -CO-NR₄-alkylene group wherein the alkylene moiety contains 2 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group, wherein

R₄ denotes a hydrogen atom,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group which may be substituted by an R₆O-CO group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a C₁₋₄-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or arylmethylcarbonylsulphenyl group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a hydroxy, C₁₋₄-alkylcarbonyloxy, arylcarbonyloxy or arylmethylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

a C₃₋₆-cycloalkyl or C₃₋₆-cycloalkyl-methyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

an aryl, arylmethyl or R_gCO-O-(R_eCR_f) group, wherein

R_e denotes a hydrogen atom or a C₁₋₄-alkyl group,

R_f denotes a hydrogen atom and

R_g denotes a C_{1-4} -alkyl, cyclopentyl, cyclohexyl, C_{1-4} -alkoxy, cyclopentyloxy or cyclohexyloxy group,

and R_9 denotes a methyl or ethyl group,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-2}$ -alkyl group and is additionally substituted at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 , 1,3-dioxolan-2-yl-methyl- NR_5 or 1,3-dioxan-2-yl-methyl- NR_5 group wherein R_5 is as hereinbefore defined,

a N-methyl- $R_{11}N$ or N-ethyl- $R_{11}N$ group wherein

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an R_gCO-O-(R_eCR_f)-O-CO or (R₇O-PO-OR₈) group wherein R_e to R_g and R₇ and R₈ are as hereinbefore defined,

F and G together denote a hydrogen atom, a methoxy, ethoxy, C₄₋₆-cycloalkoxy or C₃₋₆-cycloalkyl-C₁₋₃-alkoxy group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R₁₃, while the substituents may be identical or different and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₄-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

8. ~~(amended) Bicyclic heterocycles of general~~ A compound of the formula I according to claim 5, wherein

~~R_a to R_d, A to C and X are defined as in claim 4,~~

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, wherein

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R₃ denotes a hydrogen atom,

R_c and R_d each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group.

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D denotes a C_{1-4} -alkylene group,

a $-CO-NR_4$ -alkylene group wherein the alkylene moiety contains 2 or 3 carbon atoms, while the linking to the adjacent group C must take place via the carbonyl group wherein

R_4 denotes a hydrogen atom,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene- NR_5 or $(R_7O-PO-OR_8)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while

R_5 denotes a hydrogen atom,

a C_{1-2} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl groups, which is terminally substituted by a hydroxy, C_{1-2} -alkylcarbonylsulphenyl or C_{1-2} -alkylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

R_6 denotes a hydrogen atom,

a C_{1-8} -alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

a phenyl group optionally substituted by one or two methyl groups, a phenylmethyl group which may be substituted in the phenyl moiety by one or two methyl groups, a 5-indanyl group or an $R_gCO-O-(R_eCR_f)$ group, while

R_e denotes a hydrogen atom or a methyl group,

R_f denotes a hydrogen atom and

R_g denotes a C_{1-4} -alkyl or C_{1-2} -alkoxy group,

R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom, a methyl, ethyl or phenyl group,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or R_6O-CO -methyl group, wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or R_6O-CO -methyl groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO group, while R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R_6O-CO -methyl group and additionally at a cyclic carbon atom by an R_6O-CO group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO - group, wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 or 1,3-dioxolan-2-yl-methyl- NR_5 -group wherein R_5 is as hereinbefore defined,

an N-methyl- $R_{11}N$ or N-ethyl- $R_{11}N$ group wherein

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group,

or D together with E denotes an $R_g\text{CO-O-(R}_e\text{CR}_f\text{)-O-CO}$ group wherein R_e to R_g are as hereinbefore defined,

F and G together denote a hydrogen atom,

a methoxy, ethoxy, C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

9. (amended) Bicyelic heterocycles of general A compound of the formula I according to at least one of claims 5 to claim 8, characterised in that wherein R_b denotes one of the optionally substituted 1-phenyl-ethyl groups mentioned in the respective claim 5, 6, 7 or 8 a 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

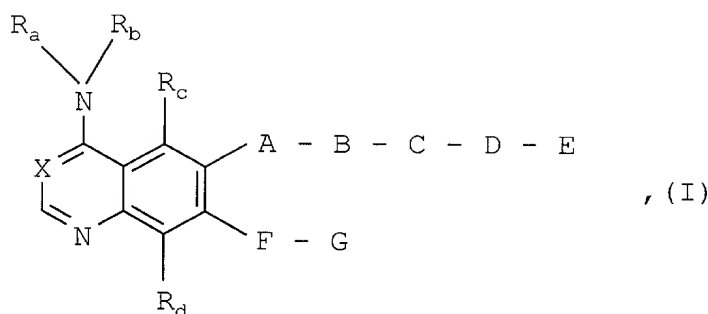
~~the or a tautomers, the stereoisomers and the or salts thereof.~~

10. (amended) Bicyelic heterocycles of general A compound of the formula I according to at least one of claims 5 to claim 8, characterised in that wherein F and G together denote one of the cycloalkoxy or cycloalkyl-alkoxy groups mentioned in the respective claim 5, 6, 7 or 8 a C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

11. (amended) Bicyelic heterocycles of general A compound of the formula I according to at least one of claims 5 to claim 8, characterised in that wherein E denotes one of the optionally substituted 2-oxo-morpholino groups mentioned in the respective claim 5, 6, 7 or 8 a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups, or a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups.

12. (amended) Bicyelic heterocycles of general A compound of the formula



wherein

~~R_a to R_d, A to C and X are defined as in claim 1;~~

R_a denotes a hydrogen atom or a C₁₋₄-alkyl group,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, whilst

R₁ and R₂, which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a C₁₋₄-alkyl, hydroxy, C₁₋₄-alkoxy, C₃₋₆-cycloalkyl, C₄₋₆-cycloalkoxy, C₂₋₅-alkenyl or C₂₋₅-alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a C₃₋₅-alkenyloxy or C₃₋₅-alkynyloxy group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, C₁₋₄-alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C₁₋₄-alkyl groups, wherein the substituents may be identical or different, or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group,

R_c and R_d, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C₁₋₄-alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

D together with E denotes a hydrogen atom,

a C₁₋₄-alkyl group optionally substituted by 1 to 5 fluorine atoms,

a C₃₋₆-cycloalkyl group,

an aryl, heteroaryl, C₁₋₄-alkylcarbonyl, arylcarbonyl or C₁₋₄-alkoxycarbonyl group,

an aminocarbonyl, C₁₋₄-alkylaminocarbonyl or di-(C₁₋₄-alkyl)-aminocarbonyl group or

a carbonyl group, which is substituted by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups, a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, wherein R₁₀ is defined as in claim 1,

F denotes a C₁₋₆-alkylene group, a -O-C₁₋₆-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, whilst the latter may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or

two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein R₅ to R₉ are defined as in claim 1,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ is defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at a cyclic carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₁₀ are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at cyclic carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ and R₁₀ are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group and is additionally substituted at cyclic carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a morpholino or homomorpholino group which is substituted in each case by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a morpholino or homomorpholino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ is defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, whilst the abovementioned 5- to 7-membered rings are in each case additionally substituted at a carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-

R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₁₀ are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ and R₁₀ are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a hydrogen atom, by a C₁₋₄-alkyl, R₆O-CO-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group, while R₆ to R₉ are defined as in claim 1 and the abovementioned 2-oxo-morpholinyl groups are in each case linked to a carbon atom of the group F,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C₁₋₄-alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 position by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group, whilst R₅ is defined as in claim 1,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is terminally substituted in each case by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl-group optionally substituted by one or two methyl groups, while R₅ is defined as in claim 1,

an R_hNR₅-group wherein R₅ is as hereinbefore defined and R_h denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-

tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally substituted by one or two methyl groups,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R_{12} , mono-, di- or trisubstituted by R_{13} or monosubstituted by R_{12} and additionally mono- or disubstituted by R_{13} , whilst the substituents may be identical or different and

R_{12} denotes a cyano, carboxy, C_{1-4} -alkoxycarbonyl, aminocarbonyl, C_{1-4} -alkylaminocarbonyl, di- $(C_{1-4}$ -alkyl)-aminocarbonyl, C_{1-4} -alkylsulphenyl, C_{1-4} -alkylsulphinyl, C_{1-4} -alkylsulphonyl, hydroxy, C_{1-4} -alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C_{1-4} -alkylamino, di- $(C_{1-4}$ -alkyl)-amino, C_{1-4} -alkyl-carbonylamino, N- $(C_{1-4}$ -alkyl)- C_{1-4} -alkylcarbonylamino, C_{1-4} -alkylsulphonylamino, N- $(C_{1-4}$ -alkyl)- C_{1-4} -alkylsulphonylamino, aminosulphonyl, C_{1-4} -alkylaminosulphonyl or di- $(C_{1-4}$ -alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group, and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-4} -alkyl, trifluoromethyl or C_{1-4} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-5} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

and moreover, the heteroaryl groups mentioned in the definitions of the abovementioned groups also include a 5-membered heteroaromatic group which contains an imino group, an oxygen or sulphur atom or an imino group, an oxygen or sulphur atom and one or two nitrogen atoms, or

a 6-membered heteroaromatic group which contains one, two or three nitrogen atoms,

whilst the abovementioned 5-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups and the abovementioned 6-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups or by a fluorine, chlorine, bromine or iodine atom, or by a trifluoromethyl, hydroxy, methoxy or ethoxy group,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

13. ~~(amended) Bicyclic heterocycles of general~~ A compound of the formula I according to claim 12, wherein

~~R_a to R_d , A to C and X are defined as in claim 2,~~
 R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl or aryl group,

F denotes an -O-C₁₋₄-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_5 to R_9 are defined as in claim 2,

a 4- to 7-membered alkyleneimino group which is substituted by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is defined as in claim 2,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and additionally at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is defined as in claim 2,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a C_{1-4} -alkyl or $R_6O-CO-C_{1-4}$ -alkyl group, while R_6 is defined as in claim 2 and the abovementioned 2-oxo-morpholinyl groups are each are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is defined as in claim 2,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is defined as in claim 2,

a R_hNR_5 group wherein R_5 is defined as in claim 2 and R_h denotes a substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally by one or two methyl groups,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may in each case be monosubstituted by R_{12} , mono- or disubstituted by R_{13} or monosubstituted by R_{12} and additionally mono or disubstituted by R_{13} , while the substituents may be identical or different and

R_{12} denotes a cyano, C_{1-2} -alkoxycarbonyl, aminocarbonyl, C_{1-2} -alkylaminocarbonyl, di- $(C_{1-2}$ -alkyl)-aminocarbonyl, C_{1-2} -alkylsulphenyl, C_{1-2} -alkylsulphinyl, C_{1-2} -alkylsulphonyl, hydroxy, nitro, amino, C_{1-2} -alkylamino or di- $(C_{1-2}$ -alkyl)-amino group and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a $C_{3,5}$ -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

14. ~~(amended) Bicyelic heterocycles of general~~ A compound of the formula I according to claim 12, wherein

~~R_a to R_d , A to C and X are defined as in claim 3,~~
 R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , while

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

R_3 denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl or aryl group,

F denotes an $-O-C_{1,4}$ -alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 group wherein the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_5 and R_6 are defined as in claim 3,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is defined as in claim 3,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl groups wherein R_6 is defined as in claim 3,

a piperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO , or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 and R_{10} are defined as in claim 3,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are defined as in claim 3,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-2}$ -alkyl group and additionally at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is defined as in claim 3,

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is defined as in claim 3,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are defined as in claim 3,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a methyl, ethyl or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is defined as in claim 3 and the abovementioned 2-oxo-morpholinyl groups in each case are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 , 1,3-dioxolan-2-yl-methyl- NR_5 or 1,3-dioxan-2-yl-methyl- NR_5 group wherein R_5 is defined as in claim 3,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R_{13} , while the substituents may be identical or different and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-4} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

15. ~~(amended) Bicyclic heterocycles of general~~ A compound of the formula I according to claim 12, wherein

~~R_a to R_d , A to C and X are defined as in claim 4,~~

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

R_c and R_d each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D together with E denotes a hydrogen atom or a methyl group,

F denotes an $-O-C_{1-4}$ -alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 group wherein the alkylene moiety, which is straight-chained and contains 1 or 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while R_5 and R_6 are defined as in claim 4,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or R_6O-CO -methyl group wherein R_6 is defined as in claim 4,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or R_6O-CO -methyl groups wherein R_6 is defined as in claim 4,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are defined as in claim 4,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is defined as in claim 4,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

16. ~~(amended) Bicyclic heterocycles of general A compound of the formula I according to at least one of claims 12 to claim 15, characterised wherein in that R_b denotes one of the optionally substituted 1-phenyl-ethyl groups mentioned in the respective claim 12, 13, 14 or 15, a 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein~~

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

~~the or a tautomers, the stereoisomers and the or salts thereof.~~

17. ~~(amended) The following compounds of general formula I according to claim 1 A compound selected from the group consisting of:~~

(a) 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(b) 4-[(3-bromophenyl)amino]-7-(3-{4-[3-(ethoxycarbonyl)propyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(c) 4-[(3-bromophenyl)amino]-7-(1-{1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}oxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(d) 4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(e) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(f) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinazoline,

(g) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(diethoxyphosphoryl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline,

(h) (*R*)-4-[(1-phenylethyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline,

(i) 4-[(3-bromophenyl)amino]-6-({4-[N-(2,2-dimethoxyethyl)-N-methylamino]-1-oxo-2-buten-1-yl}amino)-7-methoxy-quinazoline,

(j) 4-[(3-bromophenyl)amino]-6-{[4-(2-ethoxy-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline,

(k) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinoline,

(l) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,

(m) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[2-(ethoxycarbonyl)-ethyl]-N-[(ethoxycarbonyl)methyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,

(n) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline,

(o) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclobutylmethoxy-quinazoline,

(p) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-(2-cyclopropylethoxy)-quinazoline,

(q) (*S*)-4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline,

(r) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[2-(acetylsulphonyl)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline, ~~and~~ and

(s) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-[2-(methylcarbonyloxy)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,

~~and or a the salts thereof.~~

18. ~~(amended) A p~~Physiologically acceptable salts of the compounds according to at least one of a compound according to claims 1 to 17 with inorganic or organic acids or bases.

19. ~~(amended) A p~~Pharmaceutical compositions containing comprising a compound according to at least one of claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 or to 17 or a physiologically acceptable salt thereof according to claim 18 optionally together with one or more inert thereof and a pharmaceutically acceptable carriers and/or diluents.

20. ~~(amended) A~~ Use of a compound according to at least one of claims 1 to 18 for preparing a pharmaceutical composition which is suitable method for treating a benign or malignant tumours, for preventing and treating a diseases of the airways and or lungs, and for treating polyps, a diseases of the gastrointestinal tract, the bile duct and or the gall bladder, and also the kidneys and or skin, which method comprises administering a therapeutically effective amount of a compound according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 or 17 or a physiologically acceptable salt thereof.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Himmelsbach et al.
International Application No.: PCT/EP00/01496
International Filing Date: 24 February 2000 (24.02.00)
Title: 4-AMINO-QUINAZOLINE AND QUINOLINE
DERIVATIVES HAVING AN INHIBITORY EFFECT
ON SIGNAL TRANSDUCTION MEDIATED BY
TYROSINE KINASES
Docket No.: 5/1252

Box PCT
Commissioner of Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Prior to commencing examination of the above-captioned application, please amend the application as set forth below.

AMENDMENTS

Please amend the application as set forth below. All references to page and line numbers relate to the published version of the international application, WO 00/51991.

In the Description

On page 1, after the title of the invention, insert the following new paragraph and headings:

--Related Applications

This application is derived from International Application No.
PCT/EP00/01496, filed February 24, 2000, pursuant to 35 USC §371.

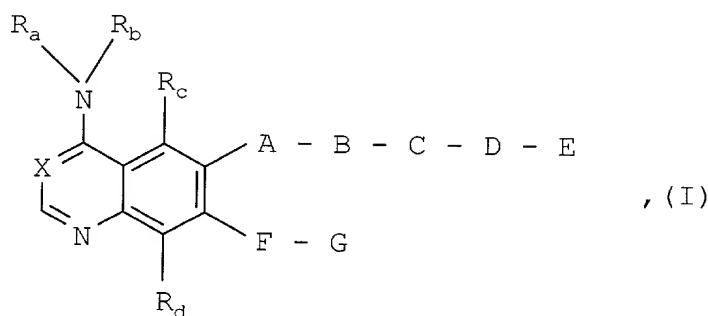
Description of the Invention--

On page 55, at line 11, delete the line of text which reads as follows:

“particularly the compounds characterized in claims 5 to 17,”

On page 55, after line 13, which reads “the tautomers, the stereoisomers and the salts thereof.”, add the new paragraphs that appear on the following pages.

Subgeneric aspect (5) of the invention is bicyclic heterocycles of general formula



wherein

R_a denotes a hydrogen atom or a C_{1-4} -alkyl group,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , whilst

R_1 and R_2 , which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a C_{1-4} -alkyl, hydroxy, C_{1-4} -alkoxy, C_{3-6} -cycloalkyl, C_{4-6} -cycloalkoxy, C_{2-5} -alkenyl or C_{2-5} -alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a C_{3-5} -alkenyloxy or C_{3-5} -alkynyloxy group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C_{1-4} -alkylsulphenyl, C_{1-4} -alkylsulphinyl, C_{1-4} -alkylsulphonyl, C_{1-4} -alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C_{1-4} -alkyl groups, wherein the substituents may be identical or different, or

R_1 together with R_2 , if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R_3 denotes a hydrogen, fluorine, chlorine or bromine atom,

a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group,

R_c and R_d, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C₁₋₄-alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

D denotes an alkylene, -CO-alkylene or -SO₂-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms and additionally 1 to 4 hydrogen atoms in the alkylene moiety may be replaced by fluorine atoms, whilst the linking of the -CO-alkylene and -SO₂-alkylene group to the adjacent group C in each case must take place via the carbonyl or sulphonyl group,

a -CO-O-alkylene, -CO-NR₄-alkylene or -SO₂-NR₄-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms, whilst the linking to the adjacent group C in each case must take place via the carbonyl or sulphonyl group wherein

R₄ denotes a hydrogen atom or a C₁₋₄-alkyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group, which may be substituted by an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, which may be terminally substituted in each case by a C₁₋₆-alkylcarbonylsulphenyl, C₃₋₇-cycloalkylcarbonylsulphenyl, C₃₋₇-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which may be terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₇-cycloalkylcarbonyloxy, C₃₋₇-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, each of which may be terminally substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₃₋₇-cycloalkyl or C₃₋₇-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group, which may be substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom or by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₄₋₇-cycloalkyl group optionally substituted by 1 or 2 methyl groups,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, wherein the unsaturated part may not be linked to the oxygen atom,

a C₃₋₇-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f)-group, whilst

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C_{1-4} -alkyl, C_{3-7} -cycloalkyl, C_{1-4} -alkoxy or C_{5-7} -cycloalkoxy group,

and R_9 denotes a C_{1-4} -alkyl, aryl or aryl- C_{1-4} -alkyl group,

a 4- to 7-membered alkyleneimino group which may be substituted by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6OCO or R_6OCO-C_{1-4} -alkyl groups or by an R_6OCO -group and an R_6OCO-C_{1-4} -alkyl group wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined and

R_{10} denotes a hydrogen atom, a C_{1-4} -alkyl, formyl, C_{1-4} -alkylcarbonyl or C_{1-4} -alkylsulphonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,

(R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, whilst the abovementioned 5- to 7-membered rings are additionally substituted in each case at a carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₁₀ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ and R₁₀ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C₁₋₂-alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C₁₋₂-alkyl groups,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C₁₋₄-alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 positions by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group, whilst R₅ is as hereinbefore defined,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R₅ is as hereinbefore defined,

an R₁₁NR₅-group wherein R₅ is as hereinbefore defined and

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an R₆CO-O-(R_eCR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group wherein R_e to R_g and R₇ to R₉ are as hereinbefore defined,

F and G together denote a hydrogen atom,

a C₁₋₆-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C₁₋₄-alkoxy group,

a C₃₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R₁₂, mono-, di- or trisubstituted by R₁₃ or monosubstituted by R₁₂ and additionally mono- or disubstituted by R₁₃, whilst the substituents may be identical or different and

R₁₂ denotes a cyano, carboxy, C₁₋₄-alkoxycarbonyl, aminocarbonyl, C₁₋₄-alkylaminocarbonyl, di-(C₁₋₄-alkyl)-aminocarbonyl, C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, hydroxy, C₁₋₄-alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C₁₋₄-alkylamino, di-(C₁₋₄-alkyl)-amino, C₁₋₄-alkyl-carbonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylcarbonylamino, C₁₋₄-alkylsulphonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylsulphonylamino, aminosulphonyl, C₁₋₄-alkylaminosulphonyl or di-(C₁₋₄-alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino-group, and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (6) of the invention is bicyclic heterocycles of general formula I, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D denotes an alkylene or -CO-alkylene group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking of the -CO-alkylene group to the adjacent group C in each case must take place via the carbonyl group,

a -CO-O-alkylene or -CO-NR₄-alkylene- group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group wherein

R₄ denotes a hydrogen atom or a methyl or ethyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group which may be substituted by an R₆O-CO group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a hydroxy, C₁₋₄-alkoxy, di-(C₁₋₄-alkyl)amino, C₁₋₆-alkylcarbonylsulphenyl, C₃₋₆-cycloalkylcarbonylsulphenyl, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₆-cycloalkylcarbonyloxy, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

a C₃₋₆-cycloalkyl or C₃₋₆-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group which may be substituted by a hydroxy, C₁₋₄-alkoxy, or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen atom or by an N-(C₁₋₂-alkyl)-imino group,

a C₄₋₆-cycloalkyl group,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, while the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₆-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f) group, while

R_e and R_f , which may be identical or different, in each case denote a hydrogen atom or a C_{1-4} -alkyl group and

R_g denotes a C_{1-4} -alkyl, C_{3-6} -cycloalkyl, C_{1-4} -alkoxy or C_{5-6} -cycloalkoxy group,

and R_9 denotes a C_{1-4} -alkyl group,

a 4- to 7-membered alkyleneimino group which is substituted by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl or ethyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl, or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is as hereinbefore defined,

a $R_{11}NR_5$ group wherein R_5 is as hereinbefore defined and

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an $R_g\text{CO-O-(R}_e\text{CR}_f\text{)-O-CO}$ or $(R_7\text{O-PO-OR}_8)$ group wherein R_e to R_g and R_7 to R_9 are as hereinbefore defined,

F and G together denote a hydrogen atom,

a C_{1-6} -alkoxy group optionally substituted from position 2 by a hydroxy or C_{1-4} -alkoxy group,

a C_{4-7} -cycloalkoxy or C_{3-7} -cycloalkyl- C_{1-4} -alkoxy group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R_{12} , mono- or disubstituted by R_{13} or monosubstituted by R_{12} and additionally mono- or disubstituted by R_{13} , whilst the substituents may be identical or different and

R_{12} denotes a cyano, C_{1-2} -alkoxycarbonyl, aminocarbonyl, C_{1-2} -alkylaminocarbonyl, di- $(C_{1-2}$ -alkyl)-aminocarbonyl, C_{1-2} -alkylsulphenyl, C_{1-2} -alkylsulphinyl, C_{1-2} -alkylsulphonyl, hydroxy, nitro, amino, C_{1-2} -alkylamino or di- $(C_{1-2}$ -alkyl)-amino, and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-5} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (7) of the invention is bicyclic heterocycles of general formula I, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , while

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

R_3 denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D denotes a C₁₋₄-alkylene group,

a -CO-NR₄-alkylene group wherein the alkylene moiety contains 2 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group, wherein

R₄ denotes a hydrogen atom,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group which may be substituted by an R₆O-CO group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a C₁₋₄-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or arylmethylcarbonylsulphenyl group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a hydroxy, C₁₋₄-alkylcarbonyloxy, arylcarbonyloxy or arylmethylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

a C₃₋₆-cycloalkyl or C₃₋₆-cycloalkyl-methyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

an aryl, arylmethyl or R_gCO-O-(R_eCR_f) group, wherein

R_e denotes a hydrogen atom or a C₁₋₄-alkyl group,

R_f denotes a hydrogen atom and

R_g denotes a C₁₋₄-alkyl, cyclopentyl, cyclohexyl, C₁₋₄-alkoxy, cyclopentyloxy or cyclohexyloxy group,

and R₉ denotes a methyl or ethyl group,

a pyrrolidino or piperidino group which is substituted by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₂-alkyl groups wherein R₆ is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at a cyclic carbon atom by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₆ is as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl or (R₇O-PO-OR₈)-C₁₋₂-alkyl group wherein R₆ to R₈ are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₂-alkyl group and is additionally substituted at a cyclic carbon atom by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is as hereinbefore defined,

a morpholino group which is substituted by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₆ is as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl or (R₇O-PO-OR₈)-C₁₋₂-alkyl group wherein R₆ to R₈ are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C₁₋₂-alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C₁₋₂-alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl-NR₅, 2,2-diethoxyethyl-NR₅, 1,3-dioxolan-2-yl-methyl-NR₅ or 1,3-dioxan-2-yl-methyl-NR₅ group wherein R₅ is as hereinbefore defined,

a N-methyl-R₁₁N or N-ethyl-R₁₁N group wherein

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an R_gCO-O-(R_eCR_f)-O-CO or (R₇O-PO-OR₈) group wherein R_e to R_g and R₇ and R₈ are as hereinbefore defined,

F and G together denote a hydrogen atom, a methoxy, ethoxy, C₄₋₆-cycloalkoxy or C₃₋₆-cycloalkyl-C₁₋₃-alkoxy group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R₁₃, while the substituents may be identical or different and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₄-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (8) of the invention is bicyclic heterocycles of general formula I, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

R_c and R_d each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D denotes a C_{1-4} -alkylene group,

a -CO-NR₄-alkylene group wherein the alkylene moiety contains 2 or 3 carbon atoms, while the linking to the adjacent group C must take place via the carbonyl group wherein

R_4 denotes a hydrogen atom,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene-NR₅ or ($R_7O-PO-OR_8$)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while

R_5 denotes a hydrogen atom,

a C_{1-2} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl groups, which is terminally substituted by a hydroxy, C_{1-2} -alkylcarbonylsulphenyl or C_{1-2} -alkylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

R_6 denotes a hydrogen atom,

a C_{1-8} -alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

a phenyl group optionally substituted by one or two methyl groups, a phenylmethyl group which may be substituted in the phenyl moiety by one or two methyl groups, a 5-indanyl group or an $R_g\text{CO-O-(R}_e\text{CR}_f\text{)}$ group, while

R_e denotes a hydrogen atom or a methyl group,

R_f denotes a hydrogen atom and

R_g denotes a C_{1-4} -alkyl or C_{1-2} -alkoxy group,

R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom, a methyl, ethyl or phenyl group,

a pyrrolidino or piperidino group which is substituted by an $R_6\text{O-CO}$ or $R_6\text{O-CO-methyl}$ group, wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two $R_6\text{O-CO}$ or $R_6\text{O-CO-methyl}$ groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an $R_6\text{O-CO}$ group, while R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an $R_6\text{O-CO-C}_{1-4}$ -alkyl, bis- $(R_6\text{O-CO})\text{-C}_{1-4}$ -alkyl or $(R_7\text{O-PO-OR}_8)\text{-C}_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6\text{O-CO-methyl}$ group and additionally at a cyclic carbon atom by an $R_6\text{O-CO}$ group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an $R_6\text{O-CO-}$ group, wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl-NR₅, 2,2-diethoxyethyl-NR₅ or 1,3-dioxolan-2-yl-methyl-NR₅-group wherein R₅ is as hereinbefore defined,

an N-methyl-R₁₁N or N-ethyl-R₁₁N group wherein

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group,

or D together with E denotes an R_gCO-O-(R_eCR_f)-O-CO group wherein R_e to R_g are as hereinbefore defined,

F and G together denote a hydrogen atom,

a methoxy, ethoxy, C₄₋₆-cycloalkoxy or C₃₋₆-cycloalkyl-C₁₋₃-alkoxy group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (9) of the invention is bicyclic heterocycles of general formula I, characterised in that R_b denotes one of the optionally substituted 1-phenyl-ethyl groups mentioned in the respective subgeneric aspects 5, 6, 7 or 8,

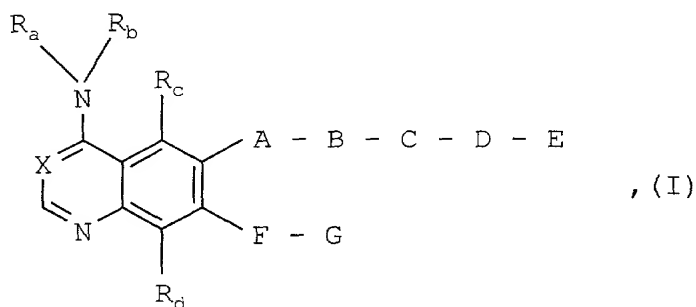
the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (10) of the invention is bicyclic heterocycles of general formula I according to at least one of subgeneric aspects 5 to 8, characterised in that F and G together denote one of the cycloalkoxy or cycloalkyl-alkoxy groups mentioned in the respective subgeneric aspects 5, 6, 7 or 8,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (11) of the invention is bicyclic heterocycles of general formula I according to at least one of subgeneric aspects 5 to 8, characterised in that E denotes one of the optionally substituted 2-oxo-morpholino groups mentioned in the respective subgeneric aspects 5, 6, 7 or 8.

Subgeneric aspect (12) of the invention is bicyclic heterocycles of general formula



wherein

R_a denotes a hydrogen atom or a C₁₋₄-alkyl group,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, whilst

R₁ and R₂, which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a C₁₋₄-alkyl, hydroxy, C₁₋₄-alkoxy, C₃₋₆-cycloalkyl, C₄₋₆-cycloalkoxy, C₂₋₅-alkenyl or C₂₋₅-alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a C₃₋₅-alkenyloxy or C₃₋₅-alkynyloxy group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, C₁₋₄-alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C₁₋₄-alkyl groups, wherein the substituents may be identical or different, or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group,

R_c and R_d, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C₁₋₄-alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

D together with E denotes a hydrogen atom,

a C₁₋₄-alkyl group optionally substituted by 1 to 5 fluorine atoms,

a C₃₋₆-cycloalkyl group,

an aryl, heteroaryl, C₁₋₄-alkylcarbonyl, arylcarbonyl or C₁₋₄-alkoxycarbonyl group,

an aminocarbonyl, C₁₋₄-alkylaminocarbonyl or di-(C₁₋₄-alkyl)-aminocarbonyl group or

a carbonyl group, which is substituted by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups, a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, wherein R₁₀ is defined as in claim 1,

F denotes a C₁₋₆-alkylene group, a -O-C₁₋₆-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, whilst the latter may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein R₅ to R₉ are defined as in claim 1,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the abovementioned 5- to 7-membered rings are in each case additionally substituted at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a hydrogen atom, by a C_{1-4} -alkyl, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while R_6 to R_9 are defined as in claim 1 and the abovementioned 2-oxo-morpholinyl groups are in each case linked to a carbon atom of the group F,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 position by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl or tri- $(C_{1-4}$ -alkoxy)-methyl group, whilst R_5 is defined as in claim 1,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is terminally substituted in each case by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl-group optionally substituted by one or two methyl groups, while R_5 is defined as in claim 1,

an R_hNR_5 -group wherein R_5 is as hereinbefore defined and R_h denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally substituted by one or two methyl groups,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R_{12} , mono-, di- or trisubstituted by R_{13} or monosubstituted by R_{12} and additionally mono- or disubstituted by R_{13} , whilst the substituents may be identical or different and

R₁₂ denotes a cyano, carboxy, C₁₋₄-alkoxycarbonyl, aminocarbonyl, C₁₋₄-alkylaminocarbonyl, di-(C₁₋₄-alkyl)-aminocarbonyl, C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, hydroxy, C₁₋₄-alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C₁₋₄-alkylamino, di-(C₁₋₄-alkyl)-amino, C₁₋₄-alkyl-carbonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylcarbonylamino, C₁₋₄-alkylsulphonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylsulphonylamino, aminosulphonyl, C₁₋₄-alkylaminosulphonyl or di-(C₁₋₄-alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group, and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

and moreover, the heteroaryl groups mentioned in the definitions of the abovementioned groups also include a 5-membered heteroaromatic group which contains an imino group, an oxygen or sulphur atom or an imino group, an oxygen or sulphur atom and one or two nitrogen atoms, or

a 6-membered heteroaromatic group which contains one, two or three nitrogen atoms,

whilst the abovementioned 5-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups and the abovementioned 6-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups or by a fluorine, chlorine, bromine or iodine atom, or by a trifluoromethyl, hydroxy, methoxy or ethoxy group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (13) of the invention comprises bicyclic heterocycles of general formula I according to subgeneric aspect 12, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl or aryl group,

F denotes an -O-C₁₋₄-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₅ to R₉ are defined as in claim 2,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is defined as in claim 2,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and additionally at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is defined as in claim 2,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a C₁₋₄-alkyl or R₆O-CO-C₁₋₄-alkyl group, while R₆ is defined as in claim 2 and the abovementioned 2-oxo-morpholinyl groups are each are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a C₁₋₄-alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained, is terminally substituted by a di-(C₁₋₄-alkoxy)-methyl group, while R₅ is defined as in claim 2,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R₅ is defined as in claim 2,

a R_hNR₅ group wherein R₅ is defined as in claim 2 and R_h denotes a substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally by one or two methyl groups,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may in each case be monosubstituted by R₁₂, mono- or disubstituted by R₁₃ or monosubstituted by R₁₂ and additionally mono or disubstituted by R₁₃, while the substituents may be identical or different and

R₁₂ denotes a cyano, C₁₋₂-alkoxycarbonyl, aminocarbonyl, C₁₋₂-alkylaminocarbonyl, di-(C₁₋₂-alkyl)-aminocarbonyl, C₁₋₂-alkylsulphenyl, C₁₋₂-alkylsulphinyl, C₁₋₂-alkylsulphonyl, hydroxy, nitro, amino, C₁₋₂-alkylamino or di-(C₁₋₂-alkyl)-amino group and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (14) of the invention comprises bicyclic heterocycles of general formula I according to subgeneric aspect 12, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

R₃ denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl or aryl group,

F denotes an -O-C₁₋₄-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅ group wherein the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₅ and R₆ are defined as in claim 3,

a pyrrolidino or piperidino group which is substituted by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is defined as in claim 3,

a pyrrolidino or piperidino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₂-alkyl groups wherein R₆ is defined as in claim 3,

a piperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO, or R₆O-CO-C₁₋₂-alkyl group, while R₆ and R₁₀ are defined as in claim 3,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are defined as in claim 3,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-2}$ -alkyl group and additionally at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is defined as in claim 3,

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is defined as in claim 3,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are defined as in claim 3,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a methyl, ethyl or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is defined as in claim 3 and the abovementioned 2-oxo-morpholinyl groups in each case are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 , 1,3-dioxolan-2-yl-methyl- NR_5 or 1,3-dioxan-2-yl-methyl- NR_5 group wherein R_5 is defined as in claim 3,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R_{13} , while the substituents may be identical or different and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-4} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (15) of the invention comprises bicyclic heterocycles of general formula I according to subgeneric aspect 12, wherein

denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

R_c and R_d each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D together with E denotes a hydrogen atom or a methyl group,

F denotes an $-O-C_{1-4}$ -alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 group wherein the alkylene moiety, which is straight-chained and contains 1 or 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while R_5 and R_6 are defined as in claim 4,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or R_6O-CO -methyl group wherein R_6 is defined as in claim 4,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or R_6O-CO -methyl groups wherein R_6 is defined as in claim 4,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are defined as in claim 4,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is defined as in claim 4,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (16) of the invention comprises bicyclic heterocycles of general formula I according to at least one of subgeneric aspects 12 to 15, characterised in that R_b denotes one of the optionally substituted 1-phenyl-ethyl groups mentioned in the respective subgeneric aspects 12, 13, 14 or 15,

the tautomers, the stereoisomers and the salts thereof.

Subgeneric aspect (17) of the invention is the following compounds of general formula I:

- (a) 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,
- (b) 4-[(3-bromophenyl)amino]-7-(3-{4-[3-(ethoxycarbonyl)propyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,
- (c) 4-[(3-bromophenyl)amino]-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}oxy)-6-[(vinylcarbonyl)amino]-quinazoline,
- (d) 4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,
- (e) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,
- (f) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinazoline,
- (g) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(diethoxyphosphoryl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline,
- (h) (*R*)-4-[(1-phenylethyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline,
- (i) 4-[(3-bromophenyl)amino]-6-({4-[N-(2,2-dimethoxyethyl)-N-methylamino]-1-oxo-2-buten-1-yl} amino)-7-methoxy-quinazoline,
- (j) 4-[(3-bromophenyl)amino]-6-{[4-(2-ethoxy-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline,
- (k) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinoline,
- (l) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,
- (m) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[2-(ethoxycarbonyl)-ethyl]-N-[(ethoxycarbonyl)methyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,
- (n) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline,

(o) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclobutyloxy-quinazoline,

(p) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-(2-cyclopropylethoxy)-quinazoline,

(q) (S)-4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline,

(r) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[2-(acetylsulphanyl)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline und

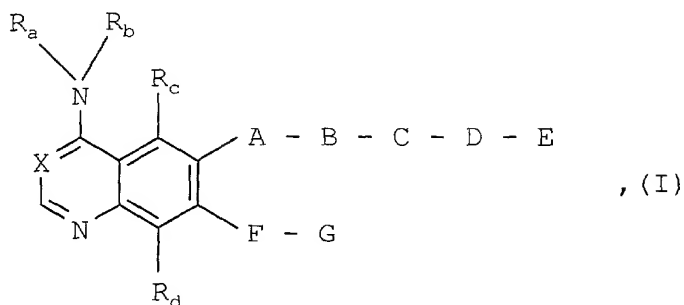
(s) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-[2-(methylcarbonyloxy)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

and the salts thereof.

Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

- 33 -

1. (amended) A compound of the formula



wherein

R_a denotes a hydrogen atom or a C_{1-4} -alkyl group,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , whilst

R_1 and R_2 , which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a C_{1-4} -alkyl, hydroxy, C_{1-4} -alkoxy, C_{3-6} -cycloalkyl, C_{4-6} -cycloalkoxy, C_{2-5} -alkenyl or C_{2-5} -alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a C_{3-5} -alkenyloxy or C_{3-5} -alkynyloxy group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C_{1-4} -alkylsulphenyl, C_{1-4} -alkylsulphinyl, C_{1-4} -alkylsulphonyl, C_{1-4} -alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C_{1-4} -alkyl groups, wherein the substituents may be identical or different, or

R_1 together with R_2 , if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R_3 denotes a hydrogen, fluorine, chlorine or bromine atom,

a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group,

R_c and R_d, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C₁₋₄-alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

D denotes an alkylene, -CO-alkylene or -SO₂-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms and additionally 1 to 4 hydrogen atoms in the alkylene moiety may be replaced by fluorine atoms, while the linking of the -CO-alkylene and -SO₂-alkylene group to the adjacent group C in each case must take place via the carbonyl or sulphonyl group,

a -CO-O-alkylene, -CO-NR₄-alkylene or -SO₂-NR₄-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms, whilst the linking to the adjacent group C in each case must take place via the carbonyl or sulphonyl group, wherein

R₄ denotes a hydrogen atom or a C₁₋₄-alkyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group, which may be substituted by an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, which may be terminally substituted in each case by a C₁₋₆-alkylcarbonylsulphenyl, C₃₋₇-cycloalkylcarbonylsulphenyl, C₃₋₇-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₇-cycloalkylcarbonyloxy, C₃₋₇-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, each of which may be terminally substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₃₋₇-cycloalkyl or C₃₋₇-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group, which may be substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom or by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₄₋₇-cycloalkyl group optionally substituted by 1 or 2 methyl groups,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₇-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f)-group, whilst

R_e and R_f , which may be identical or different, each denote a hydrogen atom or a C_{1-4} -alkyl group and

R_g denotes a C_{1-4} -alkyl, C_{3-7} -cycloalkyl, C_{1-4} -alkoxy or C_{5-7} -cycloalkoxy group,

and R_9 denotes a C_{1-4} -alkyl, aryl or aryl- C_{1-4} -alkyl group,

a 4- to 7-membered alkyleneimino group which may be substituted by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6OCO or R_6OCO-C_{1-4} -alkyl groups or by an R_6OCO -group and an R_6OCO-C_{1-4} -alkyl group wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined and

R_{10} denotes a hydrogen atom, a C_{1-4} -alkyl, formyl, C_{1-4} -alkylcarbonyl or C_{1-4} -alkylsulphonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and additionally at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl,

(R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, while the abovementioned 5- to 7-membered rings are additionally substituted in each case at a carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₁₀ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ and R₁₀ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C₁₋₂-alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C₁₋₂-alkyl groups,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C₁₋₄-alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 position in each case by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group, while R₅ is as hereinbefore defined,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R₅ is as hereinbefore defined,

an R₁₁NR₅ group wherein R₅ is as hereinbefore defined and

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

an amino group or an amino group optionally substituted by 1 or 2 C₁₋₄-alkyl groups wherein the alkyl groups may be identical or different and each alkyl moiety may be substituted from position 2 onward by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, or by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a 4- to 7-membered alkyleneimino group optionally substituted by 1 to 4 methyl groups,

a 6- to 7-membered alkyleneimino group optionally substituted by 1 or 2 methyl groups wherein in each case a methylene group in the 4 position is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, whilst R₁₀ is as hereinbefore defined,

an imidazolyl group optionally substituted by 1 to 3 methyl groups,

a C₅₋₇-cycloalkyl group wherein a methylene group is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, wherein R₁₀ is as hereinbefore defined,

or D together with E denotes a hydrogen, fluorine or chlorine atom,

a C₁₋₄-alkyl group optionally substituted by 1 to 5 fluorine atoms,

a C₃₋₆-cycloalkyl group,

an aryl, heteroaryl, C₁₋₄-alkylcarbonyl, arylcarbonyl, carboxy, C₁₋₄-alkoxycarbonyl, R_gCO-O-(R_eCR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group wherein R_e to R_g and R₇ to R₉ are as hereinbefore defined,

an aminocarbonyl, C₁₋₄-alkylaminocarbonyl or di-(C₁₋₄-alkyl)-aminocarbonyl group or

a carbonyl group, which is substituted by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, while R₁₀ is as hereinbefore defined,

F denotes a C₁₋₆-alkylene group, an -O-C₁₋₆-alkylene group, whilst the alkylene moiety is linked to the group G, or an oxygen atom, whilst the latter may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein R₅ to R₉ are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at a cyclic carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₁₀ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at cyclic carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ and R₁₀ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group and is additionally substituted at cyclic carbon atoms by one or

two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a hydrogen atom, by a C_{1-4} -alkyl, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, wherein R_6 to R_9 are as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups are each linked to a carbon atom of the group F,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 positions by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group, wherein R₅ is as hereinbefore defined,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, wherein R₅ is as hereinbefore defined,

a R_hNR₅-group wherein R₅ is as hereinbefore defined and R_h denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally substituted by one or two methyl groups,

an amino group or an amino group optionally substituted by 1 or 2 C₁₋₄-alkyl groups wherein the alkyl groups may be identical or different and each alkyl moiety may be substituted from position 2 onward by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a 4- to 7-membered alkyleneimino group optionally substituted by 1 to 4 methyl groups,

a 6- to 7-membered alkyleneimino group optionally substituted by 1 or 2 methyl groups wherein in each case a methylene group in the 4 position is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, or by a sulphinyl or sulphonyl group, wherein R₁₀ is as hereinbefore defined,

an imidazolyl group optionally substituted by 1 to 3 methyl groups,

a C₅₋₇-cycloalkyl group wherein a methylene group is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, or by a sulphinyl or sulphonyl group, wherein R₁₀ is as hereinbefore defined, or

F and G together denote a hydrogen, fluorine or chlorine atom,

a C₁₋₆-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C₁₋₄-alkoxy group,

a C₁₋₆-alkoxy group which is substituted by an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group, while R₆ to R₉ are as hereinbefore defined,

a C₃₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group, an amino group optionally substituted by 1 or 2 C₁₋₄-alkyl groups,

a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, or by a sulphinyl or sulphonyl group, while R₁₀ is as hereinbefore defined,

with the proviso that at least one of the groups E, G or F together with G denotes an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group or

D together with E contains an R_gCO-O-(R_eCR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino or thiomorpholino group substituted in the 2 position or in the 2 and 6 position by a C₁₋₄-alkoxy group,

a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group or

an optionally substituted 1,3-dioxolan-2-yl, 1,3-dioxan-2-yl, 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl-group or

E contains an optionally substituted 2-oxo-thiomorpholino group or an optionally substituted 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl-group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which may in each case be monosubstituted by R₁₂, mono, di or trisubstituted by R₁₃ or monosubstituted by R₁₂ and additionally mono or disubstituted by R₁₃, wherein the substituents may be identical or different and

R₁₂ denotes a cyano, carboxy, C₁₋₄-alkoxycarbonyl, aminocarbonyl, C₁₋₄-alkylaminocarbonyl, di-(C₁₋₄-alkyl)-aminocarbonyl, C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, hydroxy, C₁₋₄-alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C₁₋₄-alkylamino, di-(C₁₋₄-alkyl)-amino, C₁₋₄-alkyl-carbonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylcarbonylamino, C₁₋₄-alkylsulphonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylsulphonylamino, aminosulphonyl,

C₁₋₄-alkylaminosulphonyl or di-(C₁₋₄-alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino-group, and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

and moreover by the heteroaryl groups mentioned in the definitions of the abovementioned groups is meant a 5-membered heteroaromatic group which contains an imino group, an oxygen or sulphur atom or an imino group, an oxygen or sulphur atom and one or two nitrogen atoms, or

a 6-membered heteroaromatic group, which contains one, two or three nitrogen atoms,

whilst the abovementioned 5-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups and the abovementioned 6-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups or by a fluorine, chlorine, bromine or iodine atom, or by a trifluoromethyl, hydroxy, methoxy or ethoxy group,

or a tautomer or salt thereof.

2. (amended) A compound of the formula I according to claim 1, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R_3 denotes a hydrogen, fluorine, chlorine or bromine atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D denotes an alkylene or -CO-alkylene group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking of the -CO-alkylene group to the adjacent group C in each case must take place via the carbonyl group,

a -CO-O-alkylene or -CO-NR₄-alkylene- group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group wherein

R_4 denotes a hydrogen atom or a methyl or ethyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while

R_5 denotes a hydrogen atom,

a C₁₋₄-alkyl group which may be substituted by an R₆O-CO group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a hydroxy, C₁₋₄-alkoxy, di-(C₁₋₄-alkyl)amino, C₁₋₆-alkylcarbonylsulphenyl, C₃₋₆-cyclo-

alkylcarbonylsulphenyl, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₆-cycloalkylcarbonyloxy, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

a C₃₋₆-cycloalkyl or C₃₋₆-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group which may be substituted by a hydroxy, C₁₋₄-alkoxy, or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups, in each case a methylene group in the 4 position may be replaced by an oxygen atom or by an N-(C₁₋₂-alkyl)-imino group,

a C₄₋₆-cycloalkyl group,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, while the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₆-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f) group, wherein

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₆-cycloalkyl, C₁₋₄-alkoxy or C₅₋₆-cycloalkoxy group,

and R₉ denotes a C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl or ethyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is as hereinbefore defined,

a $R_{11}NR_5$ group wherein R_5 is as hereinbefore defined and

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl, aryl, $R_gCO-O-(R_eCR_f)-O-CO$ or $(R_7O-PO-OR_8)$ group wherein R_e to R_g and R_7 and R_8 are as hereinbefore defined,

F denotes an $-O-C_{1-4}$ -alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_5 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and additionally at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a C₁₋₄-alkyl or R₆O-CO-C₁₋₄-alkyl group, while R₆ is as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups in each case are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a C₁₋₄-alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained, is terminally substituted by a di-(C₁₋₄-alkoxy)-methyl group, while R₅ is as hereinbefore defined,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R₅ is as hereinbefore defined,

a R_hNR₅ group wherein R₅ is as hereinbefore defined and R_h denotes a substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally by one or two methyl groups, or

F and G together denote a hydrogen atom,

a C₁₋₄-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C₁₋₄-alkoxy group,

a C₁₋₄-alkoxy group which is substituted by an R₆O-CO group, where R₆ is as hereinbefore defined, or

a C₄₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group

with the proviso that at least one of the groups E, G or F together with G denotes an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group or

D together with E denotes an R_gCO-O-(R_eCR_f)-O-CO or (R₇O-PO-OR₈) group or

E or G denotes an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a C₁₋₄-alkoxy group,

a di-(C₁₋₄-alkoxy)-methyl group or

an optionally substituted 1,3-dioxolan-2-yl, 1,3-dioxan-2-yl, 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group or

E contains an optionally substituted 2-oxo-thiomorpholino group or an optionally substituted 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may in each case be monosubstituted by R_{12} , mono- or disubstituted by R_{13} or monosubstituted by R_{12} and additionally mono- or disubstituted by R_{13} , wherein the substituents may be identical or different and

R_{12} denotes a cyano, C_{1-2} -alkoxycarbonyl, aminocarbonyl, C_{1-2} -alkylaminocarbonyl, di- $(C_{1-2}$ -alkyl)-aminocarbonyl, C_{1-2} -alkylsulphenyl, C_{1-2} -alkylsulphinyl, C_{1-2} -alkylsulphonyl, hydroxy, nitro, amino, C_{1-2} -alkylamino or di- $(C_{1-2}$ -alkyl)-amino group and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-5} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

or a tautomer or salt thereof.

3. (amended) A compound of the formula I according to claim 1, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , while

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

R_3 denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D denotes a C₁₋₄-alkylene group,

a -CO-NR₄-alkylene group wherein the alkylene moiety contains 2 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group, wherein

R₄ denotes a hydrogen atom,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group which may be substituted by an R₆O-CO group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a C₁₋₄-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or arylmethylcarbonylsulphenyl group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a hydroxy, C₁₋₄-alkylcarbonyloxy, arylcarbonyloxy or arylmethylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

a C₃₋₆-cycloalkyl or C₃₋₆-cycloalkyl-methyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

an aryl, arylmethyl or R_eCO-O-(R_eCR_f) group, while

R_e denotes a hydrogen atom or a C₁₋₄-alkyl group,

R_f denotes a hydrogen atom and

R_g denotes a C₁₋₄-alkyl, cyclopentyl, cyclohexyl, C₁₋₄-alkoxy, cyclopentyloxy or cyclohexyloxy group,

and R₉ denotes a methyl or ethyl group,

a pyrrolidino or piperidino group which is substituted by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₂-alkyl groups wherein R₆ is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at a cyclic carbon atom by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein R₆ is as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl or (R₇O-PO-OR₈)-C₁₋₂-alkyl group wherein R₆ to R₈ are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₂-alkyl group and is additionally substituted at a cyclic carbon atom by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is as hereinbefore defined,

a morpholino group which is substituted by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₆ is as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl or (R₇O-PO-OR₈)-C₁₋₂-alkyl group wherein R₆ to R₈ are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 C₁₋₂-alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 or 2 C₁₋₂-alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl-NR₅, 2,2-diethoxyethyl-NR₅, 1,3-dioxolan-2-yl-methyl-NR₅ or 1,3-dioxan-2-yl-methyl-NR₅ group wherein R₅ is as hereinbefore defined,

a N-methyl-R₁₁N or N-ethyl-R₁₁N group wherein

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl, aryl, R_gCO-O-(R_eCR_f)-O-CO or (R₇O-PO-OR₈) group wherein R_e to R_g and R₇ and R₈ are as hereinbefore defined,

F denotes an -O-C₁₋₄-alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅ group wherein the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₅ and R₆ are as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₂-alkyl groups wherein R₆ is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO, or R₆O-CO-C₁₋₂-alkyl group, while R₆ and R₁₀ are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-2}$ -alkyl group and additionally at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined,

a piperidiny group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a methyl, ethyl or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups are each linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 , 1,3-dioxolan-2-yl-methyl- NR_5 or 1,3-dioxan-2-yl-methyl- NR_5 - group or

F and G together denote a hydrogen atom,

a methoxy or ethoxy group,

a C_{1-3} -alkoxy group which is substituted by an R_6O-CO group, while R_6 is as hereinbefore defined,

a C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group

with the proviso that at least one of the groups E, G or F together with G denotes an R_6O-CO , $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ group or

D together with E denotes an $R_gCO-O-(R_eCR_f)-O-CO$ or $(R_7O-PO-OR_8)$ group or

E or G denote an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxymethyl or 2,2-diethoxymethyl group or

an optionally substituted 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl- group or

E contains an optionally substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-thiomorpholino, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R_{13} , while the substituents may be identical or different and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-4} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

or a tautomer or salt thereof.

4. (amended) A compound of the formula I according to claim 1, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

R_c and R_d each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D denotes a C₁₋₄-alkylene group,

a -CO-NR₄-alkylene group wherein the alkylene moiety contains 2 or 3 carbon atoms, while the linking to the adjacent group C must take place via the carbonyl group wherein

R₄ denotes a hydrogen atom,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R₆O-CO-alkylene-NR₅ or (R₇O-PO-OR₈)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 2 carbon atoms, may additionally be substituted by a methyl group or by an R₆O-CO or R₆O-CO-methyl group, while

R₅ denotes a hydrogen atom,

a C₁₋₂-alkyl group which may be substituted by an R₆O-CO group,

an ethyl group optionally substituted by one or two methyl groups, which is terminally substituted by a hydroxy, C₁₋₂-alkylcarbonylsulphenyl or C₁₋₂-alkylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

R₆ denotes a hydrogen atom,

a C₁₋₈-alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

a phenyl group optionally substituted by one or two methyl groups, a phenylmethyl group which may be substituted in the phenyl moiety by one or two methyl groups, a 5-indanyl group or an R_gCO-O-(R_eCR_f) group, while

R_e denotes a hydrogen atom or a methyl group,

R_f denotes a hydrogen atom and

R_g denotes a C₁₋₄-alkyl or C₁₋₂-alkoxy group,

R₇ and R₈, which may be identical or different, each denote a hydrogen atom, a methyl, ethyl or phenyl group,

a pyrrolidino or piperidino group which is substituted by an R₆O-CO or R₆O-CO-methyl group, wherein R₆ is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R₆O-CO or R₆O-CO-methyl groups wherein R₆ is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO group, while R₆ is as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl or (R₇O-PO-OR₈)-C₁₋₂-alkyl group wherein R₆ to R₈ are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R₆O-CO-methyl group and additionally at a cyclic carbon atom by an R₆O-CO group wherein R₆ is as hereinbefore defined,

a morpholino group which is substituted by an R₆O-CO- group, while R₆ is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C₁₋₂-alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C₁₋₂-alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl-NR₅, 2,2-diethoxyethyl-NR₅ or 1,3-dioxolan-2-yl-methyl-NR₅-group wherein R₅ is as hereinbefore defined,

an N-methyl-R₁₁N or N-ethyl-R₁₁N group wherein

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group,

or D together with E denotes a hydrogen atom,

a methyl group or an $R_g\text{CO-O-(R}_e\text{CR}_f\text{)-O-CO}$ group wherein R_e to R_g are as hereinbefore defined,

F denotes a $\text{-O-C}_{1-4}\text{-alkylene}$ group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an $R_6\text{O-CO-alkylene-NR}_5$ group wherein the alkylene moiety, which is straight-chained and contains 1 or 2 carbon atoms, may additionally be substituted by a methyl group or by an $R_6\text{O-CO}$ or $R_6\text{O-CO-methyl}$ group, while R_5 and R_6 are as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by an $R_6\text{O-CO}$ or $R_6\text{O-CO-methyl}$ group wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two $R_6\text{O-CO}$ or $R_6\text{O-CO-methyl}$ groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$, bis- $(R_6\text{O-CO})\text{-C}_{1-4}\text{-alkyl}$ or $(R_7\text{O-PO-OR}_8)\text{-C}_{1-2}\text{-alkyl}$ group wherein R_6 to R_8 are as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group wherein R_6 is as hereinbefore defined, or

F and G together denote a hydrogen atom,

a methoxy or ethoxy group,

a $\text{C}_{4-6}\text{-cycloalkoxy}$ or $\text{C}_{3-6}\text{-cycloalkyl-C}_{1-3}\text{-alkoxy}$ group,

with the proviso that at least one of the groups E or G denotes an $R_6\text{O-CO}$ or $(R_7\text{O-PO-OR}_8)$ group or

D together with E denotes an $R_g\text{CO-O-(R}_e\text{CR}_f\text{)-O-CO}$ group or

E contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a methoxy or ethoxy group,

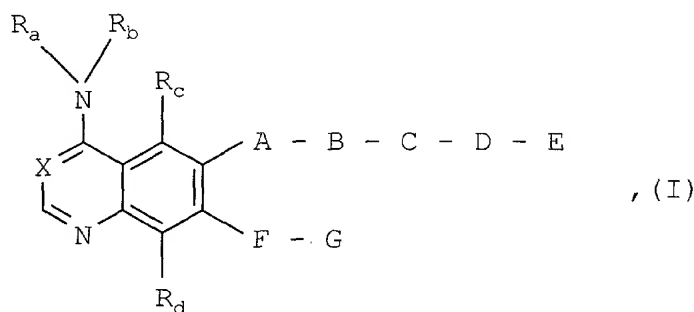
a 2,2-dimethoxymethyl or 2,2-diethoxymethyl group or

a 1,3-dioxolan-2-yl, 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group or

an optionally substituted 2-oxo-thiomorpholino group,

or a tautomer or salt thereof.

5. (amended) A compound of the of general formula



wherein

R_a denotes a hydrogen atom or a C_{1-4} -alkyl group,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , whilst

R_1 and R_2 , which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a C_{1-4} -alkyl, hydroxy, C_{1-4} -alkoxy, C_{3-6} -cycloalkyl, C_{4-6} -cycloalkoxy, C_{2-5} -alkenyl or C_{2-5} -alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a C_{3-5} -alkenyloxy or C_{3-5} -alkynyloxy group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C_{1-4} -alkylsulphenyl, C_{1-4} -alkylsulphinyl, C_{1-4} -alkylsulphonyl, C_{1-4} -alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C_{1-4} -alkyl groups, wherein the substituents may be identical or different, or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group,

R_c and R_d, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C₁₋₄-alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

D denotes an alkylene, -CO-alkylene or -SO₂-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms and additionally 1 to 4 hydrogen atoms in the alkylene moiety may be replaced by fluorine atoms, whilst the linking of the -CO-alkylene and -SO₂-alkylene group to the adjacent group C in each case must take place via the carbonyl or sulphonyl group,

a -CO-O-alkylene, -CO-NR₄-alkylene or -SO₂-NR₄-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms, whilst the linking to the adjacent group C in each case must take place via the carbonyl or sulphonyl group wherein

R₄ denotes a hydrogen atom or a C₁₋₄-alkyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 -group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, wherein

R_5 denotes a hydrogen atom,

a C_{1-4} -alkyl group, which may be substituted by an R_6O-CO , $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, which may be terminally substituted in each case by a C_{1-6} -alkylcarbonylsulphenyl, C_{3-7} -cycloalkylcarbonylsulphenyl, C_{3-7} -cycloalkyl- C_{1-3} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl- C_{1-3} -alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which may be terminally substituted in each case by a C_{1-6} -alkylcarbonyloxy, C_{3-7} -cycloalkylcarbonyloxy, C_{3-7} -cycloalkyl- C_{1-3} -alkylcarbonyloxy, arylcarbonyloxy or aryl- C_{1-3} -alkylcarbonyloxy group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, each of which may be terminally substituted by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group,

a C_{3-7} -cycloalkyl or C_{3-7} -cycloalkyl- C_{1-3} -alkyl group,

R_6 , R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom,

a C_{1-8} -alkyl group, which may be substituted by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom or by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group,

a C_{4-7} -cycloalkyl group optionally substituted by 1 or 2 methyl groups,

a C_{3-5} -alkenyl or C_{3-5} -alkynyl group, wherein the unsaturated part may not be linked to the oxygen atom,

a C₃₋₇-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f)-group, whilst

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₇-cycloalkyl, C₁₋₄-alkoxy or C₅₋₇-cycloalkoxy group,

and R₉ denotes a C₁₋₄-alkyl, aryl or aryl-C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which may be substituted by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆OCO or R₆OCO-C₁₋₄-alkyl groups or by an R₆OCO-group and an R₆OCO-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at a cyclic carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a C₁₋₄-alkyl, formyl, C₁₋₄-alkylcarbonyl or C₁₋₄-alkylsulphonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and additionally at cyclic carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ and R₁₀ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group and is additionally substituted at cyclic carbon atoms by one or

two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the abovementioned 5- to 7-membered rings are additionally substituted in each case at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 positions by a C_{1-4} -alkoxy group,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group, whilst R₅ is as hereinbefore defined,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R₅ is as hereinbefore defined,

an R₁₁NR₅-group wherein R₅ is as hereinbefore defined and

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an R_gCO-O-(R_eCR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group wherein R_e to R_g and R₇ to R₉ are as hereinbefore defined,

F and G together denote a hydrogen atom,

a C₁₋₆-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C₁₋₄-alkoxy group,

a C₃₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R₁₂, mono-, di- or trisubstituted by R₁₃ or monosubstituted by R₁₂ and additionally mono- or disubstituted by R₁₃, whilst the substituents may be identical or different and

R₁₂ denotes a cyano, carboxy, C₁₋₄-alkoxycarbonyl, aminocarbonyl, C₁₋₄-alkylaminocarbonyl, di-(C₁₋₄-alkyl)-aminocarbonyl, C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, hydroxy, C₁₋₄-alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C₁₋₄-alkylamino, di-(C₁₋₄-alkyl)-amino, C₁₋₄-alkyl-carbonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylcarbonylamino, C₁₋₄-alkylsulphonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylsulphonylamino, aminosulphonyl, C₁₋₄-alkylaminosulphonyl or di-(C₁₋₄-alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino-group, and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-5} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

or a tautomer or salt thereof.

6. (amended) A compound of the formula I according to claim 5, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , while

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R_1 together with R_2 , if they are bound to adjacent carbon atoms, denote a $-CH=CH-CH=CH-$, $-CH=CH-NH$ or $-CH=N-NH$ group and

R_3 denotes a hydrogen, fluorine, chlorine or bromine atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D denotes an alkylene or -CO-alkylene group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking of the -CO-alkylene group to the adjacent group C in each case must take place via the carbonyl group,

a -CO-O-alkylene or -CO-NR₄-alkylene- group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group wherein

R₄ denotes a hydrogen atom or a methyl or ethyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group which may be substituted by an R₆O-CO group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a hydroxy, C₁₋₄-alkoxy, di-(C₁₋₄-alkyl)amino, C₁₋₆-alkylcarbonylsulphenyl, C₃₋₆-cyclo-alkylcarbonylsulphenyl, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₆-cycloalkylcarbonyloxy, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

a C₃₋₆-cycloalkyl or C₃₋₆-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group which may be substituted by a hydroxy, C₁₋₄-alkoxy, or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen atom or by an N-(C₁₋₂-alkyl)-imino group,

a C₄₋₆-cycloalkyl group,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, while the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₆-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f) group, while

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₆-cycloalkyl, C₁₋₄-alkoxy or C₅₋₆-cycloalkoxy group,

and R₉ denotes a C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a methyl or ethyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at cyclic carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ and R₁₀ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group and is additionally substituted at cyclic carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl, or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is as hereinbefore defined,

a $R_{11}NR_5$ group wherein R_5 is as hereinbefore defined and

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an R_gCO-O-(R_eCR_f)-O-CO or (R₇O-PO-OR₈) group wherein R_e to R_g and R₇ to R₉ are as hereinbefore defined,

F and G together denote a hydrogen atom,

a C₁₋₆-alkoxy group optionally substituted from position 2 by a hydroxy or C₁₋₄-alkoxy group,

a C₄₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R₁₂, mono- or disubstituted by R₁₃ or monosubstituted by R₁₂ and additionally mono- or disubstituted by R₁₃, whilst the substituents may be identical or different and

R₁₂ denotes a cyano, C₁₋₂-alkoxycarbonyl, aminocarbonyl, C₁₋₂-alkylaminocarbonyl, di-(C₁₋₂-alkyl)-aminocarbonyl, C₁₋₂-alkylsulphenyl, C₁₋₂-alkylsulphinyl, C₁₋₂-alkylsulphonyl, hydroxy, nitro, amino, C₁₋₂-alkylamino or di-(C₁₋₂-alkyl)-amino, and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

or a tautomer or salt thereof.

7. (amended) A compound of the formula I according to claim 5, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

R_3 denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D denotes a C_{1-4} -alkylene group,

a -CO-NR₄-alkylene group wherein the alkylene moiety contains 2 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group, wherein

R_4 denotes a hydrogen atom,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene-NR₅, ($R_7O-PO-OR_8$)-alkylene-NR₅ or ($R_7O-PO-R_9$)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while

R_5 denotes a hydrogen atom,

a C_{1-4} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a C_{1-4} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or arylmethylcarbonylsulphenyl group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a hydroxy, C₁₋₄-alkylcarbonyloxy, arylcarbonyloxy or arylmethylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

a C₃₋₆-cycloalkyl or C₃₋₆-cycloalkyl-methyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

an aryl, arylmethyl or R_gCO-O-(R_eCR_f) group, wherein

R_e denotes a hydrogen atom or a C₁₋₄-alkyl group,

R_f denotes a hydrogen atom and

R_g denotes a C₁₋₄-alkyl, cyclopentyl, cyclohexyl, C₁₋₄-alkoxy, cyclopentyloxy or cyclohexyloxy group,

and R₉ denotes a methyl or ethyl group,

a pyrrolidino or piperidino group which is substituted by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₂-alkyl groups wherein R₆ is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at a cyclic carbon atom by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₆ is as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl or (R₇O-PO-OR₈)-C₁₋₂-alkyl group wherein R₆ to R₈ are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₂-alkyl group and is additionally substituted at a cyclic carbon atom by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 , 1,3-dioxolan-2-yl-methyl- NR_5 or 1,3-dioxan-2-yl-methyl- NR_5 group wherein R_5 is as hereinbefore defined,

a N-methyl- $R_{11}N$ or N-ethyl- $R_{11}N$ group wherein

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an $R_gCO-O-(R_eCR_f)-O-CO$ or $(R_7O-PO-OR_8)$ group wherein R_e to R_g and R_7 and R_8 are as hereinbefore defined,

F and G together denote a hydrogen atom, a methoxy, ethoxy, C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R_{13} , while the substituents may be identical or different and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-4} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

or a tautomer or salt thereof.

8. (amended) A compound of the formula I according to claim 5, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

R_c and R_d each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D denotes a C_{1-4} -alkylene group,

a $-CO-NR_4$ -alkylene group wherein the alkylene moiety contains 2 or 3 carbon atoms, while the linking to the adjacent group C must take place via the carbonyl group wherein

R_4 denotes a hydrogen atom,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene- NR_5 or $(R_7O-PO-OR_8)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while

R_5 denotes a hydrogen atom,

a C_{1-2} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl groups, which is terminally substituted by a hydroxy, C₁₋₂-alkylcarbonylsulphenyl or C₁₋₂-alkylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

R₆ denotes a hydrogen atom,

a C₁₋₈-alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

a phenyl group optionally substituted by one or two methyl groups, a phenylmethyl group which may be substituted in the phenyl moiety by one or two methyl groups, a 5-indanyl group or an R_gCO-O-(R_eCR_f) group, while

R_e denotes a hydrogen atom or a methyl group,

R_f denotes a hydrogen atom and

R_g denotes a C₁₋₄-alkyl or C₁₋₂-alkoxy group,

R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom, a methyl, ethyl or phenyl group,

a pyrrolidino or piperidino group which is substituted by an R₆O-CO or R₆O-CO-methyl group, wherein R₆ is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R₆O-CO or R₆O-CO-methyl groups wherein R₆ is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO group, while R₆ is as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a methyl or ethyl group,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl or (R₇O-PO-OR₈)-C₁₋₂-alkyl group wherein R₆ to R₈ are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R₆O-CO-methyl group and additionally at a cyclic carbon atom by an R₆O-CO group wherein R₆ is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO- group, wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 or 1,3-dioxolan-2-yl-methyl- NR_5 -group wherein R_5 is as hereinbefore defined,

an N-methyl- $R_{11}N$ or N-ethyl- $R_{11}N$ group wherein

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group,

or D together with E denotes an $R_gCO-O-(R_eCR_f)-O-CO$ group wherein R_e to R_g are as hereinbefore defined,

F and G together denote a hydrogen atom,

a methoxy, ethoxy, C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group,

or a tautomer or salt thereof.

9. (amended) A compound of the formula I according to claim 8, wherein R_b denotes a 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

or a tautomer or salt thereof.

10. (amended) A compound of the formula I according to claim 8, wherein F and G together denote a C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group,

or a tautomer or salt thereof.

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R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group,

R_c and R_d, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C₁₋₄-alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

D together with E denotes a hydrogen atom,

a C₁₋₄-alkyl group optionally substituted by 1 to 5 fluorine atoms,

a C₃₋₆-cycloalkyl group,

an aryl, heteroaryl, C₁₋₄-alkylcarbonyl, arylcarbonyl or C₁₋₄-alkoxycarbonyl group,

an aminocarbonyl, C₁₋₄-alkylaminocarbonyl or di-(C₁₋₄-alkyl)-aminocarbonyl group or

a carbonyl group, which is substituted by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups, a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, wherein R₁₀ is defined as in claim 1,

F denotes a C₁₋₆-alkylene group, a -O-C₁₋₆-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, whilst the latter may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein R₅ to R₉ are defined as in claim 1,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ is defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at a cyclic carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₁₀ are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at cyclic carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ and R₁₀ are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group and is additionally substituted at cyclic carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a morpholino or homomorpholino group which is substituted in each case by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the abovementioned 5- to 7-membered rings are in each case additionally substituted at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a hydrogen atom, by a C_{1-4} -alkyl, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while R_6 to R_9 are defined as in claim 1 and the abovementioned 2-oxo-morpholinyl groups are in each case linked to a carbon atom of the group F,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 position by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl or tri- $(C_{1-4}$ -alkoxy)-methyl group, whilst R_5 is defined as in claim 1,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is terminally substituted in each case by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl-group optionally substituted by one or two methyl groups, while R₅ is defined as in claim 1,

an R_hNR₅-group wherein R₅ is as hereinbefore defined and R_h denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally substituted by one or two methyl groups,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R₁₂, mono-, di- or trisubstituted by R₁₃ or monosubstituted by R₁₂ and additionally mono- or disubstituted by R₁₃, whilst the substituents may be identical or different and

R₁₂ denotes a cyano, carboxy, C₁₋₄-alkoxycarbonyl, aminocarbonyl, C₁₋₄-alkylaminocarbonyl, di-(C₁₋₄-alkyl)-aminocarbonyl, C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, hydroxy, C₁₋₄-alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C₁₋₄-alkylamino, di-(C₁₋₄-alkyl)-amino, C₁₋₄-alkyl-carbonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylcarbonylamino, C₁₋₄-alkylsulphonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylsulphonylamino, aminosulphonyl, C₁₋₄-alkylaminosulphonyl or di-(C₁₋₄-alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group, and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

and moreover, the heteroaryl groups mentioned in the definitions of the abovementioned groups also include a 5-membered heteroaromatic group which contains an imino group, an oxygen or sulphur atom or an imino group, an oxygen or sulphur atom and one or two nitrogen atoms, or

a 6-membered heteroaromatic group which contains one, two or three nitrogen atoms,

whilst the abovementioned 5-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups and the abovementioned 6-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups or by a fluorine, chlorine, bromine or iodine atom, or by a trifluoromethyl, hydroxy, methoxy or ethoxy group,

or a tautomer or salt thereof.

13. (amended) A compound of the formula I according to claim 12, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , while

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R_1 together with R_2 , if they are bound to adjacent carbon atoms, denote a $-\text{CH}=\text{CH}-\text{CH}=\text{CH}-$, $-\text{CH}=\text{CH}-\text{NH}$ or $-\text{CH}=\text{N}-\text{NH}$ group and

R_3 denotes a hydrogen, fluorine, chlorine or bromine atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl or aryl group,

F denotes an -O-C₁₋₄-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₅ to R₉ are defined as in claim 2,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is defined as in claim 2,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at a cyclic carbon atom by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ and R₁₀ are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at cyclic carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ and R₁₀ are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group and additionally at cyclic carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is defined as in claim 2,

a morpholino or homomorpholino group which is substituted in each case by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is defined as in claim 2,

a morpholino or homomorpholino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ and R₁₀ are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a C_{1-4} -alkyl or $R_6O-CO-C_{1-4}$ -alkyl group, while R_6 is defined as in claim 2 and the abovementioned 2-oxo-morpholinyl groups are each are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is defined as in claim 2,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is defined as in claim 2,

a R_hNR_5 group wherein R_5 is defined as in claim 2 and R_h denotes a substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally by one or two methyl groups,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may in each case be monosubstituted by R_{12} , mono- or disubstituted by R_{13} or monosubstituted by R_{12} and additionally mono or disubstituted by R_{13} , while the substituents may be identical or different and

R_{12} denotes a cyano, C_{1-2} -alkoxycarbonyl, aminocarbonyl, C_{1-2} -alkylaminocarbonyl, di- $(C_{1-2}$ -alkyl)-aminocarbonyl, C_{1-2} -alkylsulphenyl,

C₁₋₂-alkylsulphinyl, C₁₋₂-alkylsulphonyl, hydroxy, nitro, amino, C₁₋₂-alkylamino or di-(C₁₋₂-alkyl)-amino group and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

or a tautomer or salt thereof.

14. (amended) A compound of the formula I according to claim 12, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, while

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

R₃ denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl or aryl group,

F denotes an -O-C₁₋₄-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅ group wherein the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₅ and R₆ are defined as in claim 3,

a pyrrolidino or piperidino group which is substituted by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is defined as in claim 3,

a pyrrolidino or piperidino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₂-alkyl groups wherein R₆ is defined as in claim 3,

a piperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO, or R₆O-CO-C₁₋₂-alkyl group, while R₆ and R₁₀ are defined as in claim 3,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl or (R₇O-PO-OR₈)-C₁₋₂-alkyl group wherein R₆ to R₈ are defined as in claim 3,

a piperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₂-alkyl group and additionally at a cyclic carbon atom by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is defined as in claim 3,

a morpholino group which is substituted by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₆ is defined as in claim 3,

a piperidinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl or (R₇O-PO-OR₈)-C₁₋₂-alkyl group wherein R₆ to R₈ are defined as in claim 3,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a methyl, ethyl or R₆O-CO-C₁₋₂-alkyl group, while R₆ is defined as in claim 3 and the abovementioned 2-oxo-morpholinyl groups in each case are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl-NR₅, 2,2-diethoxyethyl-NR₅, 1,3-dioxolan-2-yl-methyl-NR₅ or 1,3-dioxan-2-yl-methyl-NR₅ group wherein R₅ is defined as in claim 3,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R₁₃, while the substituents may be identical or different and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₄-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

or a tautomer or salt thereof.

15. (amended) A compound of the formula I according to claim 12, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, wherein

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R₃ denotes a hydrogen atom,

R_c and R_d each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D together with E denotes a hydrogen atom or a methyl group,

F denotes an -O-C₁₋₄-alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅ group wherein the alkylene moiety, which is straight-chained and contains 1 or 2 carbon atoms, may additionally be substituted by a methyl group or by an R₆O-CO or R₆O-CO-methyl group, while R₅ and R₆ are defined as in claim 4,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or R_6O-CO- methyl group wherein R_6 is defined as in claim 4,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or R_6O-CO- methyl groups wherein R_6 is defined as in claim 4,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are defined as in claim 4,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is defined as in claim 4,

or a tautomer or salt thereof.

16. (amended) A compound of the formula I according to claim 15, wherein R_b denotes a 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

or a tautomer or salt thereof.

17. (amended) A compound selected from the group consisting of:

(a) 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(b) 4-[(3-bromophenyl)amino]-7-(3-{4-[3-(ethoxycarbonyl)propyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(c) 4-[(3-bromophenyl)amino]-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}oxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(d) 4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(e) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(f) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinazoline,

(g) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(diethoxyphosphoryl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline,

(h) (*R*)-4-[(1-phenylethyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline,

(i) 4-[(3-bromophenyl)amino]-6-({4-[N-(2,2-dimethoxyethyl)-N-methylamino]-1-oxo-2-buten-1-yl}amino)-7-methoxy-quinazoline,

(j) 4-[(3-bromophenyl)amino]-6-{[4-(2-ethoxy-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline,

(k) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinoline,

(l) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,

(m) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[2-(ethoxycarbonyl)ethyl]-N-[(ethoxycarbonyl)methyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,

(n) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline,

(o) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclobutyloxy-quinazoline,

(p) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-(2-cyclopropylethoxy)-quinazoline,

(q) (*S*)-4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline,

(r) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[2-(acetylsulphonyl)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline, and

(s) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[2-(methylcarbonyloxy)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,

or a salt thereof.

18. (amended) A physiologically acceptable salt of a compound according to claim 1.

19. (amended) A pharmaceutical composition comprising a compound according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 or 17 or a physiologically acceptable salt thereof and a pharmaceutically acceptable carrier or diluent.

20. (amended) A method for treating a benign or malignant tumour, a disease of the airways or lungs, polyps, a disease of the gastrointestinal tract, the bile duct or the gall bladder, kidneys or skin, which method comprises administering a therapeutically effective amount of a compound according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16 or 17 or a physiologically acceptable salt thereof.

REMARKS

The following preliminary amendments have been made.

1. A new paragraph has been added to the first page of the specification, immediately following the title of the invention, with the subheading: "Related Applications". This new paragraph indicates that this application is a 371 of PCT/EP00/01496. Also, a new subheading ("Description of the Invention") has been added immediately after this new paragraph, to indicate the beginning of the description of the invention.

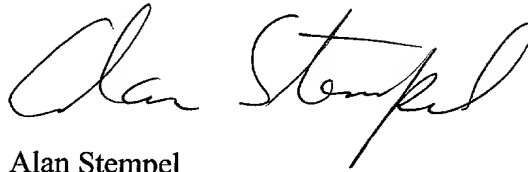
2. The specification has been amended at page 55, by deletion of the entirety of line 11, which reads:

"particularly the compounds characterized in claims 5 to 17,"

As it is impermissible for the description to incorporate matter by reference to the claims (which of course are expected to change during prosecution), the matter contained in claims 5-17 has been copied into the description by amendment. The insertion of this matter begins on page 55, at line 14. The insertion takes a form of a series of paragraphs that each begin "Subgeneric aspect (X) of the invention is ...", where X is the number of the respective claim, 5-17. Each inserted paragraph is derived from the respective claim, as it appears in the international application.

3. Claims 1-20 have been amended so as to comply with U.S. practice. Claims 21 and 22 have been canceled. It should be noted that claims 9, 10 and 11 as they appeared in the international application were multiple dependent claims which depended from four other claims in an unusual way, such a way that each of claims 9-11 actually covered 16 possible combinations. (Put another way, claims 9-11 could each have been rendered in the form of 16 regular dependent claims.) Because claims 18, 19 and 20 depend from, inter alia, claims 9-11 and are themselves multiple dependent in nature, a problem was posed. It is not permitted in U.S. practice for a multiple dependent claim to depend from another multiple dependent claim. Accordingly, claims 9-11 have been amended so as to make them regular dependent claims. As amended, each of claims 9-11 now covers only 1 of the 16 combinations that were covered by the claims as originally filed. The applicants reserve the right to add claims directed to the combinations that are not covered by claims 9-11 as amended. No dedication of this subject matter is intended.

Respectfully submitted,



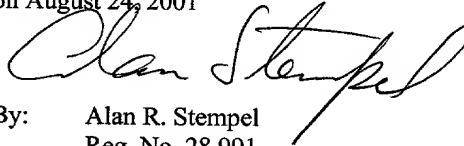
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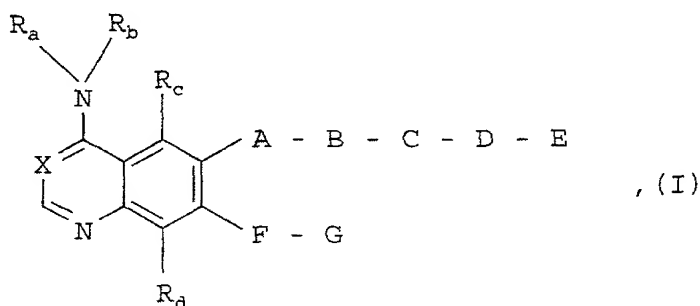
on August 24, 2001



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4-AMINO-QUINAZOLINE AND QUINOLINE DERIVATIVES HAVING AN INHIBITORY EFFECT ON SIGNAL TRANSDUCTION MEDIATED BY TYROSINE KINASES

The present invention relates to bicyclic heterocycles of general formula



the tautomers, the stereoisomers and the salts thereof, particularly the physiologically acceptable salts thereof with inorganic or organic acids or bases which have valuable pharmacological properties, particularly an inhibitory effect on signal transduction mediated by tyrosine kinases, their use for treating diseases, particularly tumoral diseases, diseases of the lungs and respiratory tract and the preparation thereof.

In the above general formula I

R_a denotes a hydrogen atom or a C_{1-4} -alkyl group,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , whilst

R_1 and R_2 , which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

- 2 -

a C₁₋₄-alkyl, hydroxy, C₁₋₄-alkoxy, C₃₋₆-cycloalkyl, C₄₋₆-cycloalkoxy, C₂₋₅-alkenyl or C₂₋₅-alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a C₃₋₅-alkenyloxy or C₃₋₅-alkynyloxy group, wherein the unsaturated part may not be linked to the oxygen atom,

a C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, C₁₋₄-alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C₁₋₄-alkyl groups, while the substituents may be identical or different, or

R₁ together with R₂, if they are bound to adjacent carbon atoms, denote a -CH=CH-CH=CH-, -CH=CH-NH or -CH=N-NH group and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group,

R_c and R_d, which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

- 3 -

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C₁₋₄-alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1- or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

D denotes an alkylene, -CO-alkylene or -SO₂-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms and additionally 1 to 4 hydrogen atoms in the alkylene moiety may be replaced by fluorine atoms, whilst the linking of the -CO-alkylene and -SO₂-alkylene group to the adjacent group C in each case must take place via the carbonyl or sulphonyl group,

a -CO-O-alkylene, -CO-NR₄-alkylene or -SO₂-NR₄-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms, whilst the linking to the adjacent group C in each case must take place via the carbonyl or sulphonyl group wherein

R₄ denotes a hydrogen atom or a C₁₋₄-alkyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

- 4 -

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 -group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, wherein

R_5 denotes a hydrogen atom,

a C_{1-4} -alkyl group, which may be substituted by an R_6O-CO , $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, which may be terminally substituted in each case by a C_{1-6} -alkylcarbonylsulphenyl, C_{3-7} -cycloalkylcarbonylsulphenyl, C_{3-7} -cycloalkyl- C_{1-3} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl- C_{1-3} -alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which may be terminally substituted in each case by a C_{1-6} -alkylcarbonyloxy, C_{3-7} -cycloalkylcarbonyloxy, C_{3-7} -cycloalkyl- C_{1-3} -alkylcarbonyloxy, arylcarbonyloxy or aryl- C_{1-3} -alkylcarbonyloxy group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, each of which may be terminally substituted by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group,

a C_{3-7} -cycloalkyl or C_{3-7} -cycloalkyl- C_{1-3} -alkyl group,

- 5 -

R_6 , R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom,

a C_{1-8} -alkyl group, which may be substituted by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom or by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group,

a C_{4-7} -cycloalkyl group optionally substituted by 1 or 2 methyl groups,

a C_{3-5} -alkenyl or C_{3-5} -alkynyl group, wherein the unsaturated part may not be linked to the oxygen atom,

a C_{3-7} -cycloalkyl- C_{1-4} -alkyl, aryl, aryl- C_{1-4} -alkyl or $R_gCO-O-(R_eCR_f)$ -group, whilst

R_e and R_f , which may be identical or different, in each case denote a hydrogen atom or a C_{1-4} -alkyl group and

R_g denotes a C_{1-4} -alkyl, C_{3-7} -cycloalkyl, C_{1-4} -alkoxy or C_{5-7} -cycloalkoxy group,

and R_h denotes a C_{1-4} -alkyl, aryl or aryl- C_{1-4} -alkyl group,

a 4- to 7-membered alkyleneimino group which may be substituted by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which may be substituted by two R_6OCO or R_6OCO-C_{1-4} -alkyl groups or by an

- 6 -

R_6 OCO-group and an R_6 OCO- C_{1-4} -alkyl group wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6 O-CO, $(R_7$ O-PO-OR₈), $(R_7$ O-PO-R₉), R_6 O-CO- C_{1-4} -alkyl, bis- $(R_6$ O-CO)- C_{1-4} -alkyl, $(R_7$ O-PO-OR₈)- C_{1-4} -alkyl or $(R_7$ O-PO-R₉)- C_{1-4} -alkyl group wherein R_6 to R_9 are as hereinbefore defined and

R_{10} denotes a hydrogen atom, a C_{1-4} -alkyl, formyl, C_{1-4} -alkylcarbonyl or C_{1-4} -alkylsulphonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at cyclic carbon atoms by two R_6 O-CO or R_6 O-CO- C_{1-4} -alkyl groups or by an R_6 O-CO-group and an R_6 O-CO- C_{1-4} -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an R_6 O-CO- C_{1-4} -alkyl, bis- $(R_6$ O-CO)- C_{1-4} -alkyl, $(R_7$ O-PO-OR₈)- C_{1-4} -alkyl or $(R_7$ O-PO-R₉)- C_{1-4} -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an R_6 O-CO- C_{1-4} -alkyl, bis- $(R_6$ O-CO)- C_{1-4} -alkyl, $(R_7$ O-PO-OR₈)- C_{1-4} -alkyl or $(R_7$ O-PO-R₉)- C_{1-4} -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6 O-CO or R_6 O-CO- C_{1-4} -alkyl groups or by an R_6 O-CO-group and an R_6 O-CO- C_{1-4} -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6 O-CO, $(R_7$ O-PO-OR₈), $(R_7$ O-PO-R₉), R_6 O-CO- C_{1-4} -alkyl, bis- $(R_6$ O-CO)- C_{1-4} -alkyl, $(R_7$ O-PO-OR₈)- C_{1-4} -alkyl or $(R_7$ O-PO-R₉)- C_{1-4} -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

- 7 -

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the above-mentioned 5- to 7-membered rings are additionally substituted in each case at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

- 8 -

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 position by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di- (C_{1-4} -alkoxy)-methyl or tri- (C_{1-4} -alkoxy)-methyl group, whilst R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R_5 is as hereinbefore defined,

an $R_{11}NR_5$ -group wherein R_5 is as hereinbefore defined and

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

an amino group or an amino group optionally substituted by 1 or 2 C_{1-4} -alkyl groups wherein the alkyl groups may be identical or different and each alkyl moiety may be substituted from position 2 by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- (C_{1-4} -alkyl)-amino group or by a 4- to 7-membered alkyleneimino

- 9 -

group, whilst in the abovementioned 6- to 7-membered alkylene-imino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, or by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a 4- to 7-membered alkyleneimino group optionally substituted by 1 to 4 methyl groups,

a 6- to 7-membered alkyleneimino group optionally substituted by 1 or 2 methyl groups wherein in each case a methylene group in the 4 position is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, whilst R₁₀ is as hereinbefore defined,

- an imidazolyl group optionally substituted by 1 to 3 methyl groups,

a C₅₋₇-cycloalkyl group wherein a methylene group is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, wherein R₁₀ is as hereinbefore defined,

or D together with E denotes a hydrogen, fluorine or chlorine atom,

a C₁₋₄-alkyl group optionally substituted by 1 to 5 fluorine atoms,

a C₃₋₆-cycloalkyl group,

an aryl, heteroaryl, C₁₋₄-alkylcarbonyl, arylcarbonyl, carboxy, C₁₋₄-alkoxycarbonyl, R₉CO-O-(R₈CR₈)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group wherein R₈ to R₉ and R₇ to R₉ are as hereinbefore defined,

an aminocarbonyl, C₁₋₄-alkylaminocarbonyl or di-(C₁₋₄-alkyl)-aminocarbonyl group or

a carbonyl group, which is substituted by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups, a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , by a sulphinyl or sulphonyl group, wherein R_{10} is as hereinbefore defined,

F denotes a C_{1-6} -alkylene group, a $-O-C_{1-6}$ -alkylene group, whilst the alkylene moiety is linked to the group G, or an oxygen atom, whilst the latter may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 -group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, wherein R_5 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the abovementioned 5- to 7-membered rings are in each case additionally substituted at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a hydrogen atom, by a C_{1-4} -alkyl, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while R_6 to R_9 are as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups are in each case linked to a carbon atom of the group F,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 position by a C_{1-4} -alkoxy group,

- 13 -

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl or tri- $(C_{1-4}$ -alkoxy)-methyl group, whilst R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is terminally substituted in each case by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl-group optionally substituted by one or two methyl groups, while R_5 is as hereinbefore defined,

an R_nNR_5 -group wherein R_5 is as hereinbefore defined and R_n denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally substituted by one or two methyl groups,

an amino group or an amino group optionally substituted by 1 or 2 C_{1-4} -alkyl groups wherein the alkyl groups may be identical or different and each alkyl moiety may be substituted from position 2 by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups a methylene group in the 4 position may be replaced in each case by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group,

a 4- to 7-membered alkyleneimino group optionally substituted by 1 to 4 methyl groups,

a 6- to 7-membered alkyleneimino group optionally substituted by 1 or 2 methyl groups wherein in each case a methylene group in the 4 position is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , a by a sulphinyl or sulphonyl group, wherein R_{10} is as hereinbefore defined,

- 14 -

an imidazolyl group optionally substituted by 1 to 3 methyl groups,

a C₅₋₇-cycloalkyl group wherein a methylene group is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, while R₁₀ is as hereinbefore defined, or

F and G together denote a hydrogen, fluorine or chlorine atom,

a C₁₋₆-alkoxy group optionally substituted from position 2 by a hydroxy or C₁₋₄-alkoxy group,

- a C₁₋₆-alkoxy group which is substituted by an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group, while R₆ to R₉ are as hereinbefore defined,

a C₃₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group, an amino group optionally substituted by 1 or 2 C₁₋₄-alkyl groups,

a 5- to 7-membered alkyleneimino group, wherein in the above-mentioned 6- to 7-membered alkyleneimino groups a methylene group in the 4 position may be replaced in each case by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, or by a sulphinyl or sulphonyl group, wherein R₁₀ is as hereinbefore defined,

with the proviso that at least one of the groups E, G or F together with G contains an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group or

D together with E contains an R₉CO-O-(R₆CR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

- 15 -

a morpholino or thiomorpholino group substituted in the 2 position or in the 2 and 6 positions by a C₁₋₄-alkoxy group,

a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group or

an optionally substituted 1,3-dioxolan-2-yl, 1,3-dioxan-2-yl, 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group or

E contains an optionally substituted 2-oxo-thiomorpholino group or an optionally substituted 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group.

By the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R₁₂, mono-, di- or trisubstituted by R₁₃, or monosubstituted by R₁₂ and additionally mono- or disubstituted by R₁₃, whilst the substituents may be identical or different and

R₁₂ denotes a cyano, carboxy, C₁₋₄-alkoxycarbonyl, aminocarbonyl, C₁₋₄-alkylaminocarbonyl, di-(C₁₋₄-alkyl)-aminocarbonyl, C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, hydroxy, C₁₋₄-alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C₁₋₄-alkylamino, di-(C₁₋₄-alkyl)-amino, C₁₋₄-alkylcarbonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylcarbonylamino, C₁₋₄-alkylsulphonylamino, N-(C₁₋₄-alkyl)-C₁₋₄-alkylsulphonylamino, aminosulphonyl, C₁₋₄-alkylaminosulphonyl or di-(C₁₋₄-alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may

- 16 -

be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino-group, and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₄-alkyl, trifluoromethyl or C₁₋₄-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group.

Moreover, the heteroaryl groups mentioned in the definitions of the abovementioned groups also include a 5-membered heteroaromatic group which contains an imino group, an oxygen or sulphur atom or an imino group, an oxygen or sulphur atom and one or two nitrogen atoms, or

a 6-membered heteroaromatic group, which contains one, two or three nitrogen atoms,

whilst the abovementioned 5-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups and the abovementioned 6-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups or by a fluorine, chlorine, bromine or iodine atom, or by a trifluoromethyl, hydroxy, methoxy or ethoxy group.

Preferred compounds of the above general formula I are those wherein

R_a denotes a hydrogen atom or a C₁₋₄-alkyl group,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, wherein

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

- 17 -

a C₁₋₄-alkyl, hydroxy, C₁₋₄-alkoxy, C₃₋₆-cycloalkyl, C₄₋₆-cycloalkoxy, C₂₋₅-alkenyl or C₂₋₅-alkynyl group,

a C₃₋₅-alkenyloxy or C₃₋₅-alkynyloxy group, while the unsaturated moiety may not be linked to the oxygen atom,

a C₁₋₄-alkylsulphenyl, C₁₋₄-alkylsulphinyl, C₁₋₄-alkylsulphonyl, C₁₋₄-alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C₁₋₄-alkyl groups, wherein the substituents may be identical or different, and

R₃ denotes a hydrogen, fluorine, chlorine or bromine atom,

a C₁₋₄-alkyl, trifluoromethyl- or C₁₋₄-alkoxy group, R_c and R_d, which may be identical or different, each denote a hydrogen, fluorine or chlorine atom, a methoxy group or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C₁₋₄-alkyl group,

B denotes a carbonyl or sulphonyl group,

- 18 -

C denotes a 1,3-allenylene, 1,1- or 1,2-vinylene group, which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

D denotes an alkylene, -CO-alkylene or -SO₂-alkylene group wherein the alkylene moiety contains 1 to 8 carbon atoms in each case and additionally 1 to 4 hydrogen atoms in the alkylene moiety may be replaced by fluorine atoms, while the linking of the -CO-alkylene or -SO₂-alkylene group to the adjacent group C must take place via the carbonyl or sulphonyl group,

a -CO-O-alkylene, -CO-NR₄-alkylene or -SO₂-NR₄-alkylene group wherein the alkylene moiety contains 1 to 8 carbon atoms in each case, while the linking to the adjacent group C must take place via the carbonyl or sulphonyl group wherein

R₄ denotes a hydrogen atom or a C₁₋₄-alkyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while

R₅ denotes a hydrogen atom,

- 19 -

a C₁₋₄-alkyl group which may be substituted by a hydroxy, C₁₋₄-alkoxy, carboxy, R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group may be replaced in the 4 position by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₃₋₇-cycloalkyl or C₃₋₇-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group which may be substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₄₋₇-cycloalkyl group optionally substituted by 1 or 2 methyl groups,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, while the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₇-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f) group, wherein

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₇-cycloalkyl, C₁₋₄-alkoxy or C₅₋₇-cycloalkoxy group,

- 20 -

and R_9 denotes a C_{1-4} -alkyl, aryl or aryl- C_{1-4} -alkyl group,

a 4- to 7-membered alkyleneimino group, which is substituted by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined and

R_{10} denotes a hydrogen atom, a C_{1-4} -alkyl, formyl, C_{1-4} -alkylcarbonyl or C_{1-4} -alkylsulphonyl group,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the above-mentioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

an amino group or an amino group optionally substituted by 1 or 2 C_{1-4} -alkyl groups, wherein the alkyl groups may be identical or different and each alkyl moiety may be substituted

- 21 -

from position 2 onwards by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups, in each case a methylene group may be replaced in the 4 position by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a 4- to 7-membered alkyleneimino group optionally substituted by 1 to 4 methyl groups,

a 6- to 7-membered alkyleneimino group optionally substituted by 1 or 2 methyl groups, wherein in each case a methylene group in the 4 position is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, while R₁₀ is as hereinbefore defined,

an imidazolyl group optionally substituted by 1 to 3 methyl groups,

a C₅₋₇-cycloalkyl group, wherein a methylene group is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, or by a sulphinyl or sulphonyl group, while R₁₀ is as hereinbefore defined,

or D together with E denotes a hydrogen, fluorine or chlorine atom,

a C₁₋₄-alkyl group optionally substituted by 1 to 5 fluorine atoms,

a C₃₋₆-cycloalkyl group,

an aryl, heteroaryl, C₁₋₄-alkylcarbonyl, arylcarbonyl, carboxy, C₁₋₄-alkoxycarbonyl, R₉CO-O-(R₆CR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-

- 22 -

R₉) group wherein R₆ to R₉ and R₇ to R₉ are as hereinbefore defined,

an aminocarbonyl, C₁₋₄-alkylaminocarbonyl or di-(C₁₋₄-alkyl)-aminocarbonyl group or

a carbonyl group which is substituted by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀ or by a sulphinyl or sulphonyl group, while R₁₀ is as hereinbefore defined,

- F denotes a C₁₋₆-alkylene group, an -O-C₁₋₆-alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein R₅ to R₉ are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group, which is substituted by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₁₀ are as hereinbefore defined,

- 23 -

a piperazino or homopiperazino group, which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

an amino group or an amino group optionally substituted by 1 or 2 C_{1-4} -alkyl groups wherein the alkyl groups may be identical or different and each alkyl moiety may be substituted from position 2 by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group,

a 4- to 7-membered alkyleneimino group optionally substituted by 1 to 4 methyl groups,

a 6- to 7-membered alkyleneimino group optionally substituted by 1 or 2 methyl groups wherein in each case a methylene group in the 4 position is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , by a sulphinyl or sulphonyl group, while R_{10} is as hereinbefore defined,

- 24 -

an imidazolyl group optionally substituted by 1 to 3 methyl groups,

a C₅₋₇-cycloalkyl group wherein a methylene group is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, by a sulphinyl or sulphonyl group, while R₁₀ is as hereinbefore defined, or

F and G together denote a hydrogen, fluorine or chlorine atom,

a C₁₋₆-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C₁₋₄-alkoxy group,

a C₁₋₆-alkoxy group which is substituted by an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group, while R₆ to R₉ are as hereinbefore defined,

a C₄₋₇-cycloalkoxy or C₃₋₇-cycloalkoxy-C₁₋₄-alkoxy group,

an amino group optionally substituted by 1 or 2 C₁₋₄-alkyl groups,

a 5- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, or by a sulphinyl or sulphonyl group, while R₁₀ is as hereinbefore defined,

with the proviso that at least one of the groups E, G or F together with G contains an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group or

D together with E contains an R₉CO-O-(R_eCR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group,

- 25 -

and also the compounds of the abovementioned general formula I wherein R_a to R_d , A to G and X are as hereinbefore defined, but additionally

the 4- to 7-membered alkyleneimino groups mentioned above in the definition of groups E and G, the piperazino and homopiperazino groups substituted by R_{10} are each additionally substituted at a cyclic carbon atom by a bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and the piperazino, homopiperazino, pyrrolidinyl, piperidinyl and hexahydroazepinyl group mentioned above in the definition of the groups E and G are each substituted at the nitrogen atom by a bis- $(R_6O-CO)-C_{1-4}$ -alkyl group,

R_1 and R_2 , which may be identical or different, denote aryl, aryloxy, arylmethyl or arylmethoxy groups or

R_1 together with R_2 , if they are bound to adjacent carbon atoms, denote an $-CH=CH-CH=CH-$, $-CH=CH-NH$ or $-CH=N-NH$ group,

E denotes a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

G denotes a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups, or

a 2-oxo-morpholinyl group which is substituted in the 4 position by a hydrogen atom, by a C_{1-4} -alkyl, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while R_6 to R_9 are as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups in each case are linked to a carbon atom of the group F, and/or

F and G together may denote a C_{3-7} -cycloalkyl- C_{1-4} -alkoxy group, with the proviso that

at least one of the groups E, G or F together with G contains an R_6O-CO , $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ group or

- 26 -

D together with E contains an $R_5\text{CO-O-(R}_6\text{CR}_f\text{)-O-CO}$, $(R_7\text{O-PO-OR}_8)$ or $(R_7\text{O-PO-R}_9)$ group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

the compounds of the abovementioned general formula I wherein R_a to R_d , A to G and X are as hereinbefore defined, but additionally

R_5 denotes an ethyl or propyl group optionally substituted by one or two methyl groups, which is terminally substituted in each case by a $C_{1,6}$ -alkylcarbonylsulphenyl, $C_{3,7}$ -cycloalkylcarbonylsulphenyl, $C_{3,7}$ -cycloalkyl- $C_{1,3}$ -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl- $C_{1,3}$ -alkylcarbonylsulphenyl group,

E denotes a morpholino or homomorpholino group, which is substituted in each case by an $R_6\text{O-CO}$, $(R_7\text{O-PO-OR}_8)$, $(R_7\text{O-PO-R}_9)$, $R_6\text{O-CO-C}_{1,4}$ -alkyl, bis- $(R_6\text{O-CO})\text{-C}_{1,4}$ -alkyl, $(R_7\text{O-PO-OR}_8)\text{-C}_{1,4}$ -alkyl or $(R_7\text{O-PO-R}_9)\text{-C}_{1,4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group substituted by 1 to 4 $C_{1,2}$ -alkyl groups with the proviso that a 2-oxo-morpholino group substituted by 1 or 2 methyl groups is excluded,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 $C_{1,2}$ -alkyl groups,

a morpholino group which is substituted in the 2 position by a $C_{1,4}$ -alkoxy group,

a morpholino group which is substituted in the 2- and 6-positions in each case by a $C_{1,4}$ -alkoxy group,

- 27 -

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is terminally substituted in each case by a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group, while R₅ is as hereinbefore defined,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is terminally substituted in each case by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R₅ is as hereinbefore defined, or

an R₁₁NR₅ group wherein R₅ is as hereinbefore defined and

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

and/or G denotes a morpholino or homomorpholino group which is substituted in each case by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a morpholino group which is substituted in the 2 position by a C₁₋₄-alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or

two methyl groups, is terminally substituted in each case by a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group, while R₅ is as hereinbefore defined,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is terminally substituted in each case by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R₅ is as hereinbefore defined, or

a R_nNR₅ group wherein R₅ is as hereinbefore defined and

R_n denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally substituted by one or two methyl groups,

with the proviso that

at least one of the groups E, G or F together with G contains an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group or

D together with E contains an R₃CO-O-(R₂CR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino group in each case substituted in the 2 position or in the 2 and 6 positions by a C₁₋₄-alkoxy group,

a di(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group or

an optionally substituted 1,3-dioxolan-2-yl, 1,3-dioxan-2-yl, 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-

- 29 -

tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group or

E contains an optionally substituted 2-oxo-thiomorpholino group or an optionally substituted 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group,

and the compounds of the abovementioned general formula I wherein R_a to R_d , A to G and X are as hereinbefore defined, but additionally

R_5 denotes an ethyl or propyl group substituted by a methyl group and a ethyl group or by two ethyl groups, which is terminally substituted in each case by a C_{1-6} -alkylcarbonylsulphenyl, C_{3-7} -cycloalkylcarbonylsulphenyl, C_{3-7} -cycloalkyl- C_{1-3} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl- C_{1-3} -alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, which is terminally substituted in each case by a C_{1-6} -alkylcarbonyloxy, C_{3-7} -cycloalkylcarbonyloxy, C_{3-7} -cycloalkyl- C_{1-3} -alkylcarbonyloxy, arylcarbonyloxy or aryl- C_{1-3} -alkylcarbonyloxy group,

E denotes a 4- to 7-membered alkyleneimino group which is substituted by two R_6 OCO or R_6 OCO- C_{1-4} -alkyl groups or by an R_6 OCO group and an R_6 OCO- C_{1-4} -alkyl group wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6 O-CO or R_6 O-CO- C_{1-4} -alkyl groups or by an R_6 O-CO group and an R_6 O-CO- C_{1-4} -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

- 30 -

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, Bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are additionally substituted in each case at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group, or

a thiomorpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group, and/or

G denotes a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and additionally at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

- a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group, or

- 32 -

a thiomorpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

with the proviso that

at least one of the groups E, G or F together with G contains an R_6O-CO , $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ group or

D together with E contains an $R_5CO-O-(R_6CR_f)-O-CO$, $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

- a morpholino or thiomorpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a di(C_{1-4} -alkoxy)-methyl or tri-(C_{1-4} -alkoxy)-methyl group or

an optionally substituted 1,3-dioxolan-2-yl, 1,3-dioxan-2-yl, 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group or

E contains an optionally substituted 2-oxo-thiomorpholino group or an optionally substituted 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group,

while the abovementioned aryl and heteroaryl moieties are as hereinbefore defined,

the tautomers, the stereoisomers and the salts thereof.

- 33 -

Particularly preferred compounds of the above general formula I are those wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

R_1 together with R_2 , if they are bound to adjacent carbon atoms, denote a $-\text{CH}=\text{CH}-\text{CH}=\text{CH}-$, $-\text{CH}=\text{CH}-\text{NH}$ or $-\text{CH}=\text{N}-\text{NH}$ group and

R_3 denotes a hydrogen, fluorine, chlorine or bromine atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

- 34 -

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D denotes an alkylene or -CO-alkylene group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking of the -CO-alkylene group to the adjacent group C in each case must take place via the carbonyl group,

- a -CO-O-alkylene or -CO-NR₄-alkylene- group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group wherein

R₄ denotes a hydrogen atom or a methyl or ethyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₆)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group which may be substituted by an R₆O-CO group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a hydroxy, C_{1-4} -alkoxy, di- $(C_{1-4}$ -alkyl)amino, C_{1-6} -alkylcarbonylsulphenyl, C_{3-6} -cycloalkylcarbonylsulphenyl, C_{3-6} -cycloalkyl- C_{1-3} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl- C_{1-3} -alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C_{1-6} -alkylcarbonyloxy, C_{3-6} -cycloalkylcarbonyloxy, C_{3-6} -cycloalkyl- C_{1-3} -alkylcarbonyloxy, arylcarbonyloxy or aryl- C_{1-3} -alkylcarbonyloxy group,

a C_{3-6} -cycloalkyl or C_{3-6} -cycloalkyl- C_{1-3} -alkyl group,

R_6 , R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom,

a C_{1-8} -alkyl group which may be substituted by a hydroxy, C_{1-4} -alkoxy, or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen atom or by an N- $(C_{1-2}$ -alkyl)-imino group,

a C_{4-6} -cycloalkyl group,

a C_{3-5} -alkenyl or C_{3-5} -alkynyl group, while the unsaturated moiety may not be linked to the oxygen atom,

a C_{3-6} -cycloalkyl- C_{1-4} -alkyl, aryl, aryl- C_{1-4} -alkyl or $R_9CO-O-(R_eCR_f)$ group, while

R_e and R_f , which may be identical or different, in each case denote a hydrogen atom or a C_{1-4} -alkyl group and

- 36 -

R_g denotes a C_{1-4} -alkyl, C_{3-6} -cycloalkyl, C_{1-4} -alkoxy or C_{5-6} -cycloalkoxy group,

and R_h denotes a C_{1-4} -alkyl group,

a 4- to 7-membered alkyleneimino group which is substituted by an R_eO-CO , $R_eO-CO-C_{1-4}$ -alkyl or bis- $(R_eO-CO)-C_{1-4}$ -alkyl group wherein R_e is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_eO-CO or $R_eO-CO-C_{1-4}$ -alkyl groups wherein R_e is as hereinbefore defined,

- a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_eO-CO , $R_eO-CO-C_{1-4}$ -alkyl or bis- $(R_eO-CO)-C_{1-4}$ -alkyl group wherein R_e is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl, ethyl, acetyl or methylsulfonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_eO-CO or $R_eO-CO-C_{1-4}$ -alkyl groups wherein R_e and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_eO-CO-C_{1-4}$ -alkyl, bis- $(R_eO-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_e to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_eO-CO-C_{1-4}$ -alkyl or bis- $(R_eO-CO)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_eO-CO or $R_eO-CO-C_{1-4}$ -alkyl groups wherein R_e is as hereinbefore defined,

- 37 -

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the above-mentioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the above-mentioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

- 38 -

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C₁₋₂-alkyl groups,

a morpholino group which is substituted in the 2 position by a C₁₋₄-alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained, is terminally substituted by a di-(C₁₋₄-alkoxy)-methyl group, while R₅ is as hereinbefore defined,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R₅ is as hereinbefore defined,

a R₁₁NR₅ group wherein R₅ is as hereinbefore defined and

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl, aryl, R₉CO-O-(R_eCR_f)-O-CO or (R₇O-PO-OR₈) group wherein R_e to R_g and R₇ and R₈ are as hereinbefore defined,

F denotes an -O-C₁₋₄-alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

- 39 -

G denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_5 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and additionally at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

- 40 -

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the above-mentioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the above-mentioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

- 41 -

a 2-oxo-morpholinyl group which is substituted in the 4 position by a C_{1-4} -alkyl or $R_6O-CO-C_{1-4}$ -alkyl group, while R_6 is as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups in each case are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di-
(C_{1-4} -alkoxy)-methyl group, while R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is as hereinbefore defined,

an R_nNR_5 group wherein R_5 is as hereinbefore defined and R_n denotes a substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally by one or two methyl groups, or

F and G together denote a hydrogen atom,

a C_{1-4} -alkoxy group optionally substituted from position 2 onwards by a hydroxy or C_{1-4} -alkoxy group,

a C_{1-4} -alkoxy group which is substituted by an R_6O-CO group, where R_6 is as hereinbefore defined, or

a C_{4-7} -cycloalkoxy or C_{3-7} -cycloalkyl- C_{1-4} -alkoxy group

- 42 -

with the proviso that at least one of the groups E, G or F together with G contains an R_6O-CO , $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ group or

D together with E contains an $R_9CO-O-(R_6CR_f)-O-CO$ or $(R_7O-PO-OR_8)$ group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a di- $(C_{1-4}$ -alkoxy)-methyl group or

an optionally substituted 1,3-dioxolan-2-yl, 1,3-dioxan-2-yl, 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group or

E contains an optionally substituted 2-oxo-thiomorpholino group or an optionally substituted 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may in each case be monosubstituted by R_{12} , mono- or disubstituted by R_{13} or monosubstituted by R_{12} and additionally mono or disubstituted by R_{13} , while the substituents may be identical or different and

R_{12} denotes a cyano, C_{1-2} -alkoxycarbonyl, aminocarbonyl, C_{1-2} -alkylaminocarbonyl, di- $(C_{1-2}$ -alkyl)-aminocarbonyl, C_{1-2} -alkylsulphenyl, C_{1-2} -alkylsulphinyl, C_{1-2} -alkylsulphonyl,

- 43 -

hydroxy, nitro, amino, C₁₋₂-alkylamino or di-(C₁₋₂-alkyl)-amino group and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

Most particularly preferred compounds of the above general formula I are those wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R₁ to R₃, wherein

R₁ and R₂, which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

R₃ denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

- 44 -

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D denotes a C_{1-4} -alkylene group,

a $-CO-NR_4$ -alkylene group wherein the alkylene moiety contains 2 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group and wherein

R_4 denotes a hydrogen atom,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while

R_5 denotes a hydrogen atom,

a C_{1-4} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a C_{1-4} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or arylmethylcarbonylsulphenyl group,

- 45 -

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a hydroxy, C_{1-4} -alkylcarbonyloxy, arylcarbonyloxy or arylmethylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

a C_{3-6} -cycloalkyl or C_{3-6} -cycloalkyl-methyl group,

R_6 , R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom,

a C_{1-8} -alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

an aryl, arylmethyl or $R_9CO-O-(R_eCR_f)$ group, while

R_e denotes a hydrogen atom or a C_{1-4} -alkyl group,

R_f denotes a hydrogen atom and

R_9 denotes a C_{1-4} -alkyl, cyclopentyl, cyclohexyl, C_{1-4} -alkoxy, cyclopentyloxy or cyclohexyloxy group,

and R_9 denotes a methyl or ethyl group,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl groups wherein R_6 is as hereinbefore defined,

- 46 -

a piperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl, ethyl, acetyl or methylsulfonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-2}$ -alkyl group and is additionally substituted at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

- 47 -

a 2,2-dimethoxyethyl-NR₅, 2,2-diethoxyethyl-NR₅, 1,3-dioxolan-2-yl-methyl-NR₅ or 1,3-dioxan-2-yl-methyl-NR₅ group wherein R₅ is as hereinbefore defined,

a N-methyl-R₁₁N or N-ethyl-R₁₁N group wherein

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl, aryl, R₉CO-O-(R₆CR_f)-O-CO or (R₇O-PO-OR₈) group wherein R₆ to R₉ and R₇ and R₈ are as hereinbefore defined,

F denotes an -O-C₁₋₄-alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an R₆O-CO-alkylene-NR₅ group wherein the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while R₅ and R₆ are as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group wherein R₆ is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₂-alkyl groups wherein R₆ is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 and R_{10} are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-2}$ -alkyl group and additionally at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a methyl, ethyl or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups in are each case linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

- 49 -

a 2,2-dimethoxyethyl-NR₅, 2,2-diethoxyethyl-NR₅, 1,3-dioxolan-2-yl-methyl-NR₅ or 1,3-dioxan-2-yl-methyl-NR₅- group or

F and G together denote a hydrogen atom,

a methoxy or ethoxy group,

a C₁₋₃-alkoxy group which is substituted by an R₆O-CO group, while R₆ is as hereinbefore defined,

a C₄₋₆-cycloalkoxy or C₃₋₆-cycloalkyl-C₁₋₃-alkoxy group

with the proviso that at least one of the groups E, G or F together with G contains an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group or

D together with E contains an R₉CO-O-(R_eCR_f)-O-CO or (R₇O-PO-OR₈) group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a dimethoxymethyl or diethoxymethyl group or

an optionally substituted 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl- group or

E contains an optionally substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-thiomorpholino, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-te-

- 50 -

trahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R_{13} , wherein the substituents may be identical or different and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-4} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

However, the most preferred compounds of the above general formula I are those wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , while

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

- 51 -

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D denotes a C_{1-4} -alkylene group,

a $-CO-NR_4$ -alkylene group wherein the alkylene moiety contains 2 or 3 carbon atoms, while the linking to the adjacent group C must take place via the carbonyl group, wherein

R_4 denotes a hydrogen atom,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene- NR_5 or $(R_7O-PO-OR_8)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while

R_5 denotes a hydrogen atom,

a C_{1-2} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl groups, which is terminally substituted by a hydroxy, C_{1-2} -alkylcarbonylsulphenyl or C_{1-2} -alkylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

R_6 denotes a hydrogen atom,

a C_{1-8} -alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

a phenyl group optionally substituted by one or two methyl groups, a phenylmethyl group which may be substituted in the phenyl moiety by one or two methyl groups, a 5-indanyl group or an $R_g\text{CO-O-(R}_e\text{CR}_f\text{)}$ group, while

R_e denotes a hydrogen atom or a methyl group,

R_f denotes a hydrogen atom and

R_g denotes a C_{1-4} -alkyl or C_{1-2} -alkoxy group,

R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom, a methyl, ethyl or phenyl group,

a pyrrolidino or piperidino group which is substituted by an $R_6\text{O-CO}$ or $R_6\text{O-CO-methyl}$ group, wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two $R_6\text{O-CO}$ or $R_6\text{O-CO-methyl}$ groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an $R_6\text{O-CO}$ group, wherein R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl, ethyl, acetyl or methylsulfonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6\text{O-CO-C}_{1-4}$ -alkyl, bis- $(R_6\text{O-CO})\text{-C}_{1-4}$ -alkyl or

- 53 -

($R_7O-PO-OR_8$)- C_{1-2} -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R_6O-CO -methyl group and additionally at a cyclic carbon atom by an R_6O-CO group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO - group, while R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 or 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 or 1,3-dioxolan-2-yl-methyl- NR_5 - group wherein R_5 is as hereinbefore defined,

an N-methyl- $R_{11}N$ or N-ethyl- $R_{11}N$ group wherein

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group,

or D together with E denotes a hydrogen atom,

a methyl group or an $R_9CO-O-(R_eCR_f)-O-CO$ group wherein R_e to R_g are as hereinbefore defined,

- 54 -

F denotes an $-O-C_{1-4}$ -alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 group wherein the alkylene moiety, which is straight-chained and contains 1 or 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while R_5 and R_6 are as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or R_6O-CO -methyl group wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or R_6O-CO -methyl groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined, or

F and G together denote a hydrogen atom,

a methoxy or ethoxy group,

a C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group,

with the proviso that at least one of the groups E or G contains an R_6O-CO or $(R_7O-PO-OR_8)$ group or

D together with E contains an $R_9CO-O-(R_8CR_7)-O-CO$ group or

E contains an optionally substituted 2-oxo-morpholinyl group,

- 55 -

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a dimethoxymethyl or diethoxymethyl group or

a 1,3-dioxolan-2-yl, 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group or

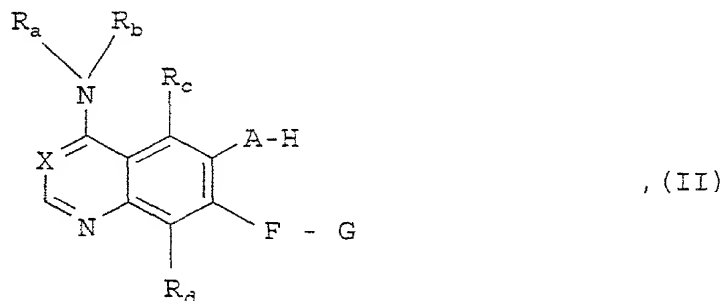
an optionally substituted 2-oxo-thiomorpholino group,

particularly the compounds characterised in claims 5 to 17,

the tautomers, the stereoisomers and the salts thereof.

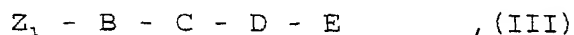
The compounds of general formula I may be prepared, for example, by the following processes:

a) reacting a compound of general formula



wherein

R_a to R_d, A, F, G and X are as hereinbefore defined, with a compound of general formula



wherein

B to E are as hereinbefore defined and

- 56 -

Z₁ denotes a leaving group such as a halogen atom, e.g. a chlorine or bromine atom, or a hydroxy group.

The reaction is optionally carried out in a solvent or mixture of solvents such as methylene chloride, dimethylformamide, benzene, toluene, chlorobenzene, tetrahydrofuran, benzene/tetrahydrofuran or dioxane optionally in the presence of an inorganic or organic base and optionally in the presence of a dehydrating agent expediently at temperatures between -50 and 150°C, preferably at temperatures between -20 and 80°C.

With a compound of general formula III, wherein Z₁ denotes a leaving group, the reaction is optionally carried out in a solvent or mixture of solvents such as methylene chloride, dimethylformamide, benzene, toluene, chlorobenzene, tetrahydrofuran, benzene/tetrahydrofuran or dioxane, conveniently in the presence of a tertiary organic base such as triethylamine, pyridine or 2-dimethylaminopyridine, in the presence of N-ethyl-diisopropylamine (Hünig's base), whilst these organic bases may simultaneously serve as solvent, or in the presence of an inorganic base such as sodium carbonate, potassium carbonate or sodium hydroxide solution expediently at temperatures between -50 and 150°C, preferably at temperatures between -20 and 80°C.

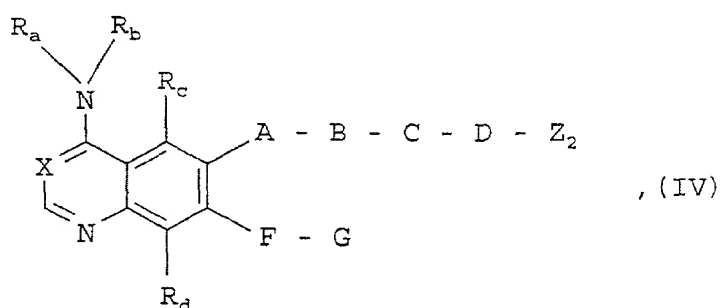
With a compound of general formula III, wherein Z₁ denotes a hydroxy group, the reaction is preferably carried out in the presence of a dehydrating agent, e.g. in the presence of isobutyl chloroformate, thionyl chloride, trimethylchlorosilane, phosphorus trichloride, phosphorus pentoxide, hexamethyldisilazane, N,N'-dicyclohexylcarbodiimide, N,N'-dicyclohexylcarbodiimide/N-hydroxysuccinimide or 1-hydroxy-benzotriazole and optionally also in the presence of 4-dimethylamino-pyridine, N,N'-carbonyldiimidazole or triphenylphosphine/carbon tetrachloride, conveniently in a solvent such as methylene chloride, tetrahydrofuran, dioxane, toluene, chlorobenzene, dimethylsulphoxide, ethyleneglycol diethylether or sulpholane and

- 57 -

optionally in the presence of a reaction accelerator such as 4-dimethylaminopyridine at temperatures between -50 and 150°C, but preferably at temperatures between -20 and 80°C.

b) In order to prepare compounds of general formula I, wherein the group E is linked to the group D via a nitrogen atom:

reacting a compound of general formula



wherein

R_a to R_d , A to D, F, G and X are as hereinbefore defined and Z_2 denotes a leaving group such as a halogen atom, a substituted hydroxy or sulphonyloxy group such as a chlorine or bromine atom, a methanesulphonyloxy or p-toluenesulphonyloxy group or a hydroxy group, with a compound of general formula



wherein

Y denotes one of the groups mentioned for E hereinbefore, which is linked to the group D via a nitrogen atom.

The reaction is conveniently carried out in a solvent such as isopropanol, butanol, tetrahydrofuran, dioxan, toluene, chlorobenzene, dimethylformamide, dimethylsulphoxide, methylene chloride, ethyleneglycol monomethylether, ethyleneglycol diethylether or sulpholane, optionally in the presence of an inorganic or tertiary organic base, e.g. sodium carbonate or

- 58 -

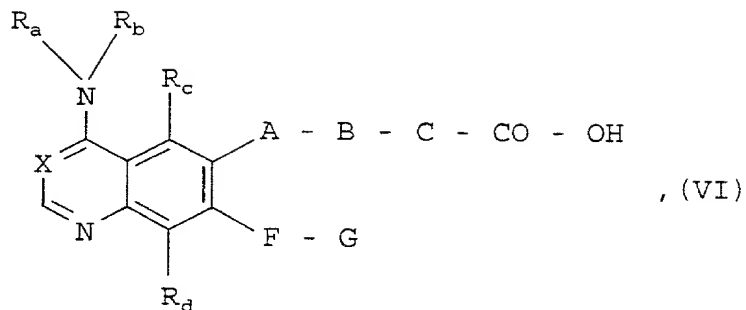
potassium hydroxide, a tertiary organic base, e.g. triethylamine, or in the presence of N-ethyl-diisopropylamine (Hünig's base), whilst these organic bases may simultaneously serve as solvent, and optionally in the presence of a reaction accelerator such as an alkali metal halide at temperatures between -20 and 150°C, but preferably at temperatures between -10 and 100°C. The reaction may, however, also be carried out without a solvent or in an excess of the compound of general formula V used.

If Z₂ in a compound of general formula IV denotes a hydroxy group, the reaction is preferably carried out in the presence of a dehydrating agent, e.g. in the presence of isobutyl chloroformate, thionylchloride, trimethylchlorosilane, phosphorus trichloride, phosphorus pentoxide, hexamethyldisilazane, N,N'-dicyclohexylcarbodiimide, N,N'-dicyclohexylcarbodiimide/N-hydroxysuccinimide or 1-hydroxy-benzotriazole and optionally also in the presence of 4-dimethylamino-pyridine, N,N'-carbonyldiimidazole or triphenylphosphine/carbon tetrachloride, conveniently in a solvent such as methylene chloride, tetrahydrofuran, dioxane, toluene, chlorobenzene, dimethylsulphoxide, ethyleneglycol diethylether or sulpholane and optionally in the presence of a reaction accelerator such as 4-dimethylaminopyridine at temperatures between -50 and 150°C, but preferably at temperatures between -20 and 80°C.

c) In order to prepare compounds of general formula I wherein D together with E denotes a R₆CO-O-(R₆CR₂)-O-CO- group:

reacting a compound of general formula

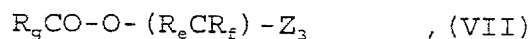
- 59 -



wherein

R_a to R_d , A to C, F, G and X are as hereinbefore defined,

with a compound of general formula



wherein

R_e to R_g are as hereinbefore defined and

Z_3 denotes a leaving group such as a halogen atom, e.g. a chlorine, bromine or iodine atom.

The reaction is appropriately carried out in a solvent such as tetrahydrofuran, dioxane, toluene, chlorobenzene, dimethylformamide, dimethylsulphoxide, methylene chloride, acetonitrile, N-methyl-pyrrolidinone, ethylenglycol diethylether or sulpholane, optionally in the presence of an inorganic base, e.g. sodium carbonate or potassium hydroxide, or a tertiary organic base, e.g. triethylamine, N-ethyl-diisopropylamine (Hünig's base), 1,8-diazabicyclo[5,4,0]undec-7-ene or N,N'-di-cyclohexyl-morpholinocarboxamidine, whilst these organic bases may simultaneously serve as solvents, and optionally in the presence of a reaction accelerator such as an alkali metal halide at temperatures between -20 and 150°C , but preferably at temperatures between -10 and 100°C . However, the reaction may also be carried out without a solvent or in an excess of the compound of general formula VII used.

If according to the invention a compound of general formula I is obtained which contains a hydroxy, amino, alkylamino or

- 60 -

imino group, this may be converted by acylation or sulphonylation into a corresponding acyloxy, acylamino, N-alkyl-acylamino, acyl-imino, sulphonyloxy, sulphonylamino, N-alkyl-sulphonylamino or sulphonyl-imino compound, whilst a sulphonyloxy compound thus obtained may further be converted into a corresponding sulphenyl compound by reacting with an alkali metal salt of a thio compound, or

if a compound of general formula I is obtained which contains an amino, alkylamino or imino group, this may be converted by alkylation or reductive alkylation into a corresponding alkyl compound of general formula I or

if a compound of general formula I is obtained wherein E denotes a bis-[2,2-di-(C₁₋₄-alkoxy)ethyl]amino group, this may be converted by intramolecular cyclisation into a corresponding morpholino compound of general formula I, or

if a compound of general formula I is obtained wherein E or G denotes an optionally substituted N-(2-hydroxyethyl)-glycine or N-(2-hydroxyethyl)-glycine ester group, this may be converted by intramolecular cyclisation into a corresponding 2-oxo-morpholino compound, or

if a compound of general formula I is obtained which contains a carboxy or hydroxyphosphoryl group, this may be converted by alkylation into a corresponding ester of general formula I.

The subsequent acylation or sulphonylation is optionally carried out in a solvent or mixture of solvents such as methylene chloride, dimethylformamide, benzene, toluene, chlorobenzene, tetrahydrofuran, benzene/tetrahydrofuran or dioxane with a corresponding acyl or sulphonyl derivative optionally in the presence of a tertiary organic base or in the presence of an inorganic base or in the presence of a dehydrating agent, e.g. in the presence of isobutyl chloroformate, thionyl chloride, trimethyl chlorosilane, sulphuric acid, methanesul-

- 61 -

phonic acid, p-toluenesulphonic acid, phosphorus trichloride, phosphorus pentoxide, N,N'-dicyclohexylcarbodiimide, N,N'-dicyclohexylcarbodiimide/N-hydroxysuccinimide or 1-hydroxy-benzotriazole and optionally additionally in the presence of 4-dimethylamino-pyridine, N,N'-carbonyldiimidazole or triphenylphosphine/carbon tetrachloride, expediently at temperatures between 0 and 150°C, preferably at temperatures between 0 and 80°C.

The subsequent alkylation is optionally carried out in a solvent or mixture of solvents such as methylene chloride, dimethylformamide, benzene, toluene, chlorobenzene, tetrahydrofuran, benzene/tetrahydrofuran or dioxan with an alkylating agent such as a corresponding halide or sulphonic acid ester, e.g. with methyl iodide, ethyl bromide, dimethylsulphate or benzyl chloride, optionally in the presence of a tertiary organic base or in the presence of an inorganic base, expediently at temperatures between 0 and 150°C, preferably at temperatures between 0 and 100°C.

The subsequent reductive alkylation is carried out with a corresponding carbonyl compound such as formaldehyde, acetaldehyde, propionaldehyde, acetone or butyraldehyde in the presence of a complex metal hydride such as sodium borohydride, lithium borohydride, sodium triacetoxyborohydride or sodium cyanoborohydride expediently at a pH of 6-7 and at ambient temperature or in the presence of a hydrogenation catalyst, e.g. with hydrogen in the presence of palladium/charcoal, at a hydrogen pressure of 1 to 5 bar. The methylation may also be carried out in the presence of formic acid as reducing agent at elevated temperatures, e.g. at temperatures between 60 and 120°C.

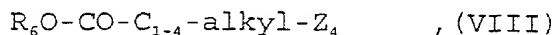
The subsequent intramolecular cyclisation is optionally carried out in a solvent such as acetonitrile, methylene chloride, tetrahydrofuran, dioxan or toluene in the presence of an

- 62 -

axis such as hydrochloric acid or p-toluenesulphonic acid at temperatures between -10 and 120°C.

The subsequent esterification is carried out by reacting a corresponding carboxylic acid, phosphonic acid, phosphinic acid or the salts thereof with a corresponding alkyl halide, optionally in a solvent or mixture of solvents such as methylene chloride, dimethylformamide, dimethylsulphoxide, sulfolane, acetonitrile, N-methyl-pyrrolidinone, benzene, toluene, chlorobenzene, tetrahydrofuran, benzene/tetrahydrofuran or dioxane, optionally in the presence of an inorganic or tertiary organic base, conveniently at temperatures between 0 and 150°C, preferably at temperatures between 0 and 80°C.

Moreover, compounds of general formula I wherein E or G denotes a piperazino or homopiperazino group each substituted in position 4 by an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined may also be prepared, for example, by reacting a corresponding compound containing a piperazino or homopiperazino group each unsubstituted in position 4 with a compound of general formula

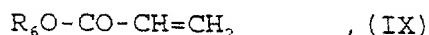


wherein

R_6 is as hereinbefore defined and

Z_4 denotes a leaving group such as a chlorine or bromine atom or an alkyl or arylsulfonyloxy group, or

compounds of general formula I wherein E or G denotes a piperazino or homopiperazino group each substituted in position 4 by an $R_6O-CO-CH_2CH_2$ -group wherein R_6 is as hereinbefore defined may also be prepared, for example, by reacting a corresponding compound containing a piperazino or homopiperazino group each unsubstituted in position 4 with a compound of general formula

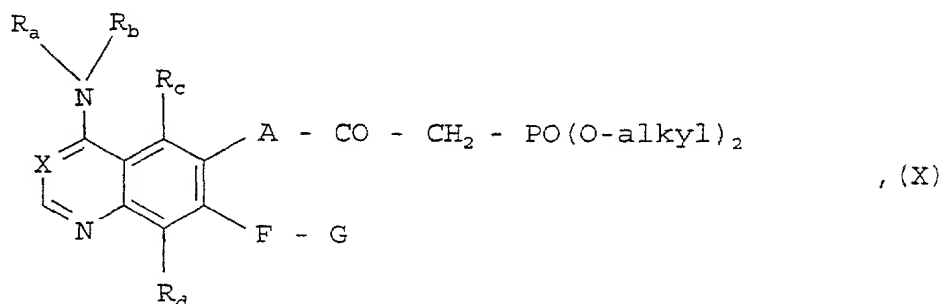


- 63 -

wherein

R_c is as hereinbefore defined, or

compounds of general formula I wherein C denotes a 1,2-vinylene group may also be prepared, for example, by reacting a compound of general formula



wherein

R_a to R_d , A, F, G and X are as hereinbefore defined and alkyl denotes a lower alkyl group, with a compound of general formula



wherein

D and E are as hereinbefore defined according to known methods.

In the reactions described above, any reactive groups present such as hydroxy, carboxy, phosphono, O-alkyl-phosphono, amino, alkylamino or imino groups may be protected during the reaction by conventional protecting groups which are cleaved again after the reaction.

For example, a protecting group for a hydroxy group may be a trimethylsilyl, acetyl, benzoyl, methyl, ethyl, tert.-butyl, trityl, benzyl or tetrahydropyranyl group,

- 64 -

protecting groups for a carboxy group may be the trimethylsilyl, methyl, ethyl, tert.-butyl, benzyl or tetrahydropyranyl group,

protecting groups for a phosphono group may be an alkyl group such as the methyl, ethyl, isopropyl or n-butyl group, the phenyl or benzyl group and

protecting groups for an amino, alkylamino or imino group may be a formyl, acetyl, trifluoroacetyl, ethoxycarbonyl, tert.-butoxycarbonyl, benzyloxycarbonyl, benzyl, methoxybenzyl or 2,4-dimethoxybenzyl group and for the amino group additionally a phthalyl group.

Any protecting group used is optionally subsequently cleaved for example by hydrolysis in an aqueous solvent, e.g. in water, isopropanol/water, acetic acid/water, tetrahydrofuran/water or dioxane/water, in the presence of an acid such as trifluoroacetic acid, hydrochloric acid or sulphuric acid or in the presence of an alkali metal base such as sodium hydroxide or potassium hydroxide or aprotically, e.g. in the presence of iodotrimethylsilane, at temperatures between 0 and 120°C, preferably at temperatures between 10 and 100°C.

However, a benzyl, methoxybenzyl or benzyloxycarbonyl group is cleaved, for example, hydrogenolytically, e.g. with hydrogen in the presence of a catalyst such as palladium/charcoal in a suitable solvent such as methanol, ethanol, ethyl acetate or glacial acetic acid, optionally with the addition of an acid such as hydrochloric acid at temperatures between 0 and 100°C, but preferably at temperatures between 20 and 60°C, and at a hydrogen pressure of 1 to 7 bar, but preferably 3 to 5 bar. A 2,4-dimethoxybenzyl group, however, is preferably cleaved in trifluoroacetic acid in the presence of anisole.

A tert.-butyl or tert.-butyloxycarbonyl group is preferably cleaved by treating with an acid such as trifluoroacetic acid

or hydrochloric acid or by treating with iodotrimethylsilane optionally using a solvent such as methylene chloride, dioxane, methanol or diethylether.

A trifluoroacetyl group is preferably cleaved by treating with an acid such as hydrochloric acid, optionally in the presence of a solvent such as acetic acid at temperatures between 50 and 120°C or by treating with sodium hydroxide solution optionally in the presence of a solvent such as tetrahydrofuran at temperatures between 0 and 50°C.

A phthalyl group is preferably cleaved in the presence of hydrazine or a primary amine such as methylamine, ethylamine or n-butylamine in a solvent such as methanol, ethanol, isopropanol, toluene/water or dioxane at temperatures between 20 and 50°C.

A single alkyl group may be cleaved from an O,O'-dialkylphosphono group with sodium iodide, for example, in a solvent such as acetone, methylethylketone, acetonitrile or dimethylformamide at temperatures between 40 and 150°C, but preferably at temperatures between 60 and 100°C.

Both alkyl groups may be cleaved from an O,O'-dialkyl-phosphono group with iodotrimethylsilane, bromotrimethylsilane or chlorotrimethylsilane/sodium iodide, for example, in a solvent such as methyl chloride, chloroform or acetonitrile at temperatures between 0°C and the boiling temperature of the reaction mixture, but preferably at temperatures between 20 and 60°C.

Moreover, the compounds of general formula I obtained may be resolved into their enantiomers and/or diastereomers, as mentioned hereinbefore. Thus, for example, cis/trans mixtures may be resolved into their cis and trans isomers, and compounds with at least one optically active carbon atom may be separated into their enantiomers.

- 66 -

Thus, for example, the cis/trans mixtures may be resolved by chromatography into the cis and trans isomers thereof, the compounds of general formula I obtained which occur as racemates may be separated by methods known *per se* (cf. allinger N. L. and Eliel E. L. in "Topics in Stereochemistry", Vol. 6, Wiley Interscience, 1971) into their optical antipodes and compounds of general formula I with at least 2 asymmetric carbon atoms may be resolved into their diastereomers on the basis of their physical-chemical differences using methods known *per se*, e.g. by chromatography and/or fractional crystallisation, and, if these compounds are obtained in racemic form, they may subsequently be resolved into the enantiomers as mentioned above.

The enantiomers are preferably separated by column separation on chiral phases or by recrystallisation from an optically active solvent or by reacting with an optically active substance which forms salts or derivatives such as e.g. esters or amides with the racemic compound, particularly acids and the activated derivatives or alcohols thereof, and separating the diastereomeric mixture of salts or derivatives thus obtained, e.g. on the basis of their differences in solubility, whilst the free antipodes may be released from the pure diastereomeric salts or derivatives by the action of suitable agents. Optically active acids in common use are e.g. the D- and L-forms of tartaric acid or dibenzoyltartaric acid, di-o-tolyltartaric acid, malic acid, mandelic acid, camphorsulphonic acid, glutamic acid, aspartic acid or quinic acid. An optically active alcohol may be for example (+) or (-)-menthol and an optically active acyl group in amides, for example, may be a (+)-or (-)-menthyloxycarbonyl.

Furthermore, the compounds of formula I may be converted into the salts thereof, and particularly for pharmaceutical use into the physiologically acceptable salts with inorganic or organic acids. Acids which may be used for this purpose include for example hydrochloric acid, hydrobromic acid, sulphuric acid,

- 67 -

phosphoric acid, fumaric acid, succinic acid, lactic acid, citric acid, tartaric acid or maleic acid.

Moreover, if the new compounds of formula I thus obtained contain a carboxy or hydroxyphosphoryl group, they may subsequently, if desired, be converted into the salts thereof with inorganic or organic bases, particularly for pharmaceutical use into the physiologically acceptable salts thereof. Suitable bases for this purpose include for example sodium hydroxide, potassium hydroxide, arginine, cyclohexylamine, ethanolamine, diethanolamine and triethanolamine.

The compounds of general formulae II to XI used as starting materials are known from the literature in some cases or may be obtained by methods known from the literature (cf. Examples I to XVIII).

For example, a starting compound of general formula II is obtained by reacting a corresponding fluoronitro compound with a corresponding alkoxide and subsequently reducing the nitro compound thus obtained or

a starting compound of general formula IV is obtained by reacting a corresponding fluoronitro compound with a corresponding alkoxide, subsequently reducing the nitro compound thus obtained and then acylating with a corresponding compound.

As already mentioned hereinbefore, the compounds of general formula I according to the invention and the physiologically acceptable salts thereof have valuable pharmacological properties, particularly an inhibiting effect on signal transduction mediated by the Epidermal Growth Factor receptor (EGF-R), whilst this may be achieved for example by inhibiting ligand bonding, receptor dimerisation or tyrosinekinase itself. It is also possible to block the transmission of signals to components located further down.

- 68 -

The biological properties of the new compounds were investigated as follows:

The inhibition of the EGF-R-mediated signal transmission can be demonstrated e.g. with cells which express human EGF-R and whose survival and proliferation depend on stimulation by EGF or TGF- α . A cell line of murine origin dependent on interleukin-3 (IL-3) which was genetically modified to express functional human EGF-R was used here. The proliferation of these cells known as F/L-HERc can therefore be stimulated either by murine IL-3 or by EGF (cf. von Rüden, T. et al. in EMBO J. 7, 2749-2756 (1988) and Pierce, J. H. et al. in Science 239, 628-631 (1988)).

The starting material used for the F/L-HERc cells was the cell line FDC-P₁, the production of which has been described by Dexter, T. M. et al. in J. Exp. Med. 152, 1036-1047 (1980). alternatively, however, other growth-factor-dependent cells may also be used (cf. for example Pierce, J. H. et al. in Science 239, 628-631 (1988), Shibuya, H. et al. in Cell 70, 57-67 (1992) and alexander, W. S. et al. in EMBO J. 10, 3683-3691 (1991)). For expressing the human EGF-R cDNA (cf. Ullrich, A. et al. in Nature 309, 418-425 (1984)) recombinant retroviruses were used as described by von Rüden, T. et al., EMBO J. 7, 2749-2756 (1988), except that the retroviral vector LXS_N (cf. Miller, A. D. et al. in BioTechniques 7, 980-990 (1989)) was used for the expression of the EGF-R cDNA and the line GP+E86 (cf. Markowitz, D. et al. in J. Virol. 62, 1120-1124 (1988)) was used as the packaging cell.

The test was performed as follows:

F/L-HERc cells were cultivated in RPMI/1640 medium (BioWhittaker), supplemented with 10 % foetal calf serum (FCS, Boehringer Mannheim), 2 mM glutamine (BioWhittaker), standard antibiotics and 20 ng/ml of human EGF (Promega), at 37°C and 5% CO₂. In order to investigate the inhibitory activity of the

- 69 -

compounds according to the invention, 1.5×10^4 cells per well were cultivated in triplicate in 96-well plates in the above medium (200 μ l), the cell proliferation being stimulated with either EGF (20 ng/ml) or murine IL-3. The IL-3 used was obtained from culture supernatants of the cell line X63/0 mIL-3 (cf. Karasuyama, H. et al. in Eur. J. Immunol. 18, 97-104 (1988)). The compounds according to the invention were dissolved in 100% dimethylsulphoxide (DMSO) and added to the cultures in various dilutions, the maximum DMSO concentration being 1%. The cultures were incubated for 48 hours at 37°C.

In order to determine the inhibitory activity of the compounds according to the invention the relative cell number was measured in O.D. units using the Cell Titer 96TM AQueous Non-Radioactive Cell Proliferation Assay (Promega). The relative cell number was calculated as a percentage of the control (F/LHERc cells without inhibitor) and the concentration of active substance which inhibits the proliferation of the cells by 50% (IC₅₀) was derived therefrom. The following results were obtained:

Compound (Example no.)	Inhibition of EGF-dependent proliferation IC ₅₀ [nM]
1	2.6
1 (4)	15
1 (6)	15
1 (10)	21
1 (13)	8.7
2	5.2
2 (4)	6.7
5 (2)	9
5 (8)	1.8
5 (10)	1.8
5 (12)	18
5 (18)	7.4
5 (22)	58

- 70 -

Compound (Example no.)	Inhibition of EGF-dependent proliferation IC ₅₀ [nM]
5 (25)	74
5 (29)	1.9
5 (32)	17
5 (36)	3
8 (1)	109
11	74

The compounds of general formula I according to the invention thus inhibit the signal transduction by tyrosine kinases, as demonstrated by the example of the human EGF receptor, and are therefore useful for treating pathophysiological processes caused by hyperfunction of tyrosinekinases. These are e.g. benign or malignant tumours, particularly tumours of epithelial and neuroepithelial origin, metastatisation and the abnormal proliferation of vascular endothelial cells (neoangiogenesis).

The compounds according to the invention are also useful for preventing and treating diseases of the airways and lungs which are accompanied by increased or altered production of mucus caused by stimulation by tyrosine kinases, e.g. in inflammatory diseases of the airways such as chronic bronchitis, chronic obstructive bronchitis, asthma, bronchiectasias, allergic or non-allergic rhinitis or sinusitis, cystic fibrosis, α 1-antitrypsin deficiency, or coughs, pulmonary emphysema, pulmonary fibrosis and hyperreactive airways.

The compounds are also suitable for treating diseases of the gastrointestinal tract and bile duct and gall bladder which are associated with disrupted activity of the tyrosine kinases, such as may be found e.g. in chronic inflammatory changes such as cholecystitis, Crohn's disease, ulcerative colitis, and ulcers in the gastrointestinal tract or such as may occur in diseases of the gastrointestinal tract which are

- 71 -

associated with increased secretions, such as Ménétrier's disease, secreting adenomas and protein loss syndrome,

and also for treating nasal polyps and polyps of the gastrointestinal tract of varying origins, such as villous or adenomatous polyps of the large bowel, but also polyps in familial polyposis coli, intestinal polyps in Gardner's syndrome, polyps throughout the entire gastrointestinal tract in Peutz-Jeghers syndrome, in inflammatory Pseudopolyps, in juvenile polyps, in colitis cystica profunda and in pneumatosis cystoides intestinales.

In addition, the compounds of general formula I and the physiologically acceptable salts thereof may be used to treat kidney diseases, particularly in cystic changes such as cystic kidneys, for treating renal cysts which may be of idiopathic origin or which occur in syndromes such as tuberous sclerosis, in von Hippel-Lindau syndrome, in nephronophthisis and spongy kidney and other diseases caused by abnormal function of tyrosine kinases, such as e.g. epidermal hyperproliferation (psoriasis), inflammatory processes, diseases of the immune system, hyperproliferation of haematopoietic cells, etc.

By reason of their biological properties the compounds according to the invention may be used on their own or in conjunction with other pharmacologically active compounds, for example in tumour therapy, in monotherapy or in conjunction with other anti-tumour therapeutic agents, for example in combination with topoisomerase inhibitors (e.g. etoposide), mitosis inhibitors (e.g. vinblastin), compounds which interact with nucleic acids (e.g. cis-platin, cyclophosphamide, adriamycin), hormone antagonists (e.g. tamoxifen), inhibitors of metabolic processes (e.g. 5-FU etc.), cytokines (e.g. interferons), antibodies, etc. For treating respiratory tract diseases, these compounds may be used on their own or in conjunction with other therapeutic agents for the airways, such as substances with a secretolytic, broncholytic and/or antiinflammatory activity. For

- 72 -

treating diseases in the region of the gastrointestinal tract, these compounds may also be administered on their own or in conjunction with substances having an effect on motility or secretion or with antiinflammatories. These combinations may be administered either simultaneously or sequentially.

These compounds may be administered either on their own or in conjunction with other active substances by intravenous, subcutaneous, intramuscular, intrarectal, intraperitoneal or intranasal route, by inhalation or transdermally or orally, whilst aerosol formulations are particularly suitable for inhalation.

For pharmaceutical use the compounds according to the invention are generally used for warm-blooded vertebrates, particularly humans, in doses of 0.01-100 mg/kg of body weight, preferably 0.1-15 mg/kg. For administration they are formulated with one or more conventional inert carriers and/or diluents, e.g. with corn starch, lactose, glucose, microcrystalline cellulose, magnesium stearate, polyvinylpyrrolidone, citric acid, tartaric acid, water, water/ethanol, water/glycerol, water/sorbitol, water/polyethyleneglycol, propyleneglycol, stearylalcohol, carboxymethylcellulose or fatty substances such as hard fat or suitable mixtures thereof in conventional galenic preparations such as plain or coated tablets, capsules, powders, suspensions, solutions, sprays or suppositories.

The following Examples are intended to illustrate the present invention without restricting it:

Preparation of the starting compounds:

Example I

6-amino-4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-quinazoline

180 mg of iron powder are added to 465 mg of 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-propyloxy)-6-nitro-quinazoline in 20 ml of ethanol. The reaction mixture is heated to boiling and combined with 0.6 ml of glacial acetic acid, then a further 2 ml of water are pipetted in. The reaction solution turns dark and is heated for about another half hour until the reaction is complete. The solvent is distilled off using the rotary evaporator, the residue is taken up in methylene chloride and made alkaline with 3 ml of 4N sodium hydroxide solution. The organic phase is separated off and the aqueous phase extracted with methylene chloride. The combined extracts are dried over magnesium sulphate and concentrated by evaporation. The crude product is stirred with a little diethyl ether, suction filtered and washed again. The light grey crystals obtained are dried in the desiccator.

Yield: 350 mg (79 % of theory),

Melting point: 183-189°C

Mass spectrum (ESI⁺): m/z = 543, 545 [M+H]⁺

The following compounds are obtained analogously to Example I:

(1) 6-amino-4-[(3-bromophenyl)amino]-7-(3-{4-[(isopropoxy-carbonyl)methyl]-piperazin-1-yl}propyloxy)-quinazoline (the reaction is carried out in dioxane instead of ethanol)

Melting point: 188-193°C

Mass spectrum (ESI⁺): m/z = 557, 559 [M+H]⁺

(2) 6-amino-4-[(3-bromophenyl)amino]-7-(3-{4-[(cyclohexyloxy-carbonyl)methyl]-piperazin-1-yl}propyloxy)-quinazoline (the reaction is carried out in dioxane instead of ethanol)

Melting point: 166-169°C

- 74 -

Mass spectrum (ESI⁺): m/z = 597, 599 [M+H]⁺

(3) 6-amino-4-[(3-bromophenyl)amino]-7-(3-{4-[2-(ethoxycarbonyl)ethyl]-piperazin-1-yl}propyloxy)-quinazoline

Melting point: 120-123°C

Mass spectrum (ESI⁺): m/z = 557, 559 [M+H]⁺

(4) 6-amino-4-[(3-bromophenyl)amino]-7-(3-{4-[3-(ethoxycarbonyl)propyl]-piperazin-1-yl}propyloxy)-quinazoline

Melting point: 119-122°C

Mass spectrum (ESI⁺): m/z = 571, 573 [M+H]⁺

(5) 6-amino-4-[(3-bromophenyl)amino]-7-(2-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}ethoxy)-quinazoline

Melting point: 147-161°C

Mass spectrum (ESI⁺): m/z = 529, 531 [M+H]⁺

(6) 6-amino-4-[(3-bromophenyl)amino]-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}oxy)-quinazoline

Melting point: 202°C

Mass spectrum (ESI⁺): m/z = 500, 502 [M+H]⁺

(7) 6-amino-4-[(3-bromophenyl)amino]-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}methoxy)-quinazoline

Melting point: 155°C

Mass spectrum (ESI⁺): m/z = 514, 516 [M+H]⁺

(8) 6-amino-4-[(3-bromophenyl)amino]-7-(2-{1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}ethoxy)-quinazoline

Melting point: 143°C

Mass spectrum (ESI⁺): m/z = 528, 530 [M+H]⁺

(9) 6-amino-4-[(3-bromophenyl)amino]-7-(3-{1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}propyloxy)-quinazoline

Melting point: 181°C

Mass spectrum (ESI⁺): m/z = 542, 544 [M+H]⁺

- 75 -

(10) 6-amino-4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)methyl]-piperazin-1-yl}propyloxy)-quinazoline

Melting point: 201-205°C

Mass spectrum (ESI⁺): m/z = 607, 609 [M+H]⁺

(11) 6-amino-4-[(3-bromophenyl)amino]-7-(3-{4-[(butyloxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-quinazoline

Melting point: 158-160°C

Mass spectrum (ESI⁺): m/z = 571, 573 [M+H]⁺

(12) 6-amino-4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-quinazoline

R_f value: 0.49 (silica gel, methylene chloride/methanol/concentrated aqueous ammonia solution = 90:10:0.1)

Mass spectrum (ESI⁺): m/z = 488, 490 [M+H]⁺

(13) 6-amino-4-[(3-bromophenyl)amino]-7-(2-{N-[(ethoxycarbonyl)methyl]-N-methylamino}ethoxy)-quinazoline

R_f value: 0.50 (silica gel, methylene chloride/methanol/concentrated aqueous ammonia solution = 90:10:0.1)

(14) 6-amino-4-[(3-chloro-4-fluorophenyl)amino]-7-cyclopropylmethoxy-quinazoline

Melting point: 209°C

R_f value: 0.68 (silica gel, ethyl acetate)

(15) 6-amino-4-[(3-bromophenyl)amino]-7-(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}butyloxy)-quinazoline

R_f value: 0.44 (silica gel, methylene chloride/methanol/concentrated aqueous ammonia solution = 90:10:0.1)

(16) 6-amino-4-[(3-chloro-4-fluorophenyl)amino]-7-cyclohexylmethoxy-quinazoline

Melting point: 234°C

Mass spectrum (ESI⁺): m/z = 401, 403 [M+H]⁺

- 76 -

(17) 6-amino-4-[(3-chloro-4-fluorophenyl)amino]-7-cyclohexyl-oxy-quinazoline

Melting point: 176°C

Mass spectrum (ESI⁺): m/z = 387, 389 [M+H]⁺

(18) 6-amino-4-[(3-chloro-4-fluorophenyl)amino]-7-cyclobutyl-oxy-quinazoline

Melting point: 238-239°C

Mass spectrum (ESI⁺): m/z = 359, 361 [M+H]⁺

(19) 6-amino-4-[(3-chloro-4-fluorophenyl)amino]-7-cyclobutyl-methoxy-quinazoline

Melting point: 214-215°C

Mass spectrum (ESI⁺): m/z = 373, 375 [M+H]⁺

(20) 6-amino-4-[(3-chloro-4-fluorophenyl)amino]-7-cyclopentyl-methoxy-quinazoline

Melting point: 218-219°C

Mass spectrum (ESI⁺): m/z = 387, 389 [M+H]⁺

(21) 6-amino-4-[(3-chloro-4-fluorophenyl)amino]-7-(2-cyclopropylethoxy)-quinazoline

Melting point: 188-190°C

Mass spectrum (ESI⁺): m/z = 373, 375 [M+H]⁺

(22) 6-amino-4-[(3-chloro-4-fluorophenyl)amino]-7-cyclopentyl-oxy-quinazoline

Melting point: 204°C

Mass spectrum (ESI⁺): m/z = 373, 375 [M+H]⁺

(23) 6-amino-4-[(3-chlorophenyl)amino]-7-methoxy-quinazoline

Melting point: 208-209°C

Mass spectrum (ESI⁺): m/z = 301, 303 [M+H]⁺

- 77 -

(24) (R)-6-amino-4-[(1-phenylethyl)amino]-7-methoxy-quinazoline

R_f value: 0.42 (silica gel, methylene chloride/methanol/concentrated aqueous ammonia solution = 9:1:0.1)

Mass spectrum (ESI⁺): m/z = 295 [M+H]⁺

(25) 6-Amino-4-[(R)-(1-phenyl-ethyl)amino]-7-{2-[2-(methoxycarbonyl)-piperidin-1-yl]-ethoxy}-quinazoline

R_f value: 0.50 (silica gel, methylene chloride/methanol/concentrated aqueous ammonia = 90:10:1)

Mass spectrum (ESI⁻): m/z = 448 [M-H]⁻

(26) 6-Amino-4-[(R)-(1-phenyl-ethyl)amino]-7-{2-[(R)-2-(methoxycarbonyl)-pyrrolidin-1-yl]-ethoxy}-quinazoline

R_f value: 0.20 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (ESI⁻): m/z = 434 [M-H]⁻

(27) 6-Amino-4-[(R)-(1-phenyl-ethyl)amino]-7-{2-[(S)-2-(methoxycarbonyl)-pyrrolidin-1-yl]-ethoxy}-quinazoline

R_f value: 0.20 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (ESI⁻): m/z = 434 [M-H]⁻

(28) 6-Amino-4-[(R)-(1-phenyl-ethyl)amino]-7-{3-[(R)-2-(methoxycarbonyl)-pyrrolidin-1-yl]-propyloxy}-quinazoline

R_f value: 0.40 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 448 [M-H]⁻

(29) 6-Amino-4-[(R)-(1-phenyl-ethyl)amino]-7-{4-[2-(methoxycarbonyl)-piperidin-1-yl]-butyloxy}-quinazoline

R_f value: 0.20 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (ESI⁻): m/z = 476 [M-H]⁻

(30) 6-Amino-4-[(R)-(1-phenyl-ethyl)amino]-7-cyclobutyloxy-quinazoline

R_f value: 0.28 (silica gel, ethyl acetate)

Mass spectrum (ESI⁺): m/z = 335 [M+H]⁺

- 78 -

(31) 6-Amino-4-[(R)-(1-phenyl-ethyl)amino]-7-cyclopentyloxy-quinazoline

R_f value: 0.20 (silica gel, ethyl acetate)

Mass spectrum (ESI⁺): m/z = 349 [M+H]⁺

(32) 6-Amino-4-[(R)-(1-phenyl-ethyl)amino]-7-cyclopropylmethoxy-quinazoline

Melting point: 183°C

Mass spectrum (ESI⁺): m/z = 335 [M+H]⁺

(33) 6-Amino-4-benzylamino-7-cyclopropylmethoxy-quinazoline

Melting point: 190°C

Mass spectrum (ESI⁺): m/z = 321 [M+H]⁺

(34) 6-Amino-4-[(R)-(1-phenyl-ethyl)amino]-7-(2-{N-[(methoxycarbonyl)methyl]-N-methylamino}-ethoxy)-quinazoline

R_f value: 0.16 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (EI): m/z = 409 [M]⁺

Example II

4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-nitro-quinazoline

292 mg of ethyl bromoacetate are added to 780 mg of 4-[(3-bromophenyl)amino]-7-[3-(piperazin-1-yl)propyloxy]-6-nitro-quinazoline and 0.55 ml of triethylamine in 7 ml of acetonitrile. The reaction mixture is stirred for one hour at ambient temperature, then for about 1.5 hours at 65°C and then for a further 2 days at ambient temperature. As the reaction is incomplete, 2 drops of ethyl bromoacetate are added twice more. The reaction solution is concentrated by evaporation and the residue is partitioned between copious amounts of ethyl acetate and dilute potassium carbonate solution. The organic phase is washed with water and saturated sodium chloride solution, dried over magnesium sulphate and concentrated by evaporation. The yellowish, resin-like crude product is

- 79 -

recrystallised from 7 ml of ethanol. The yellow crystals are washed with some cold ethanol and dried in the desiccator.

Yield: 640 mg (70 % of theory),

Melting point: 75°C

Mass spectrum (ESI⁺): m/z = 573, 575 [M+H]⁺

The following compounds are obtained analogously to Example II:

(1) 4-[(3-bromophenyl)amino]-7-(3-{4-[(isopropoxyloxycarbonyl)-methyl]-piperazin-1-yl}propyloxy)-6-nitro-quinazoline

Melting point: 71-74°C

Mass spectrum (ESI⁺): m/z = 587, 589 [M+H]⁺

(2) 4-[(3-bromophenyl)amino]-7-(3-{4-[(cyclohexyloxycarbonyl)-methyl]-piperazin-1-yl}propyloxy)-6-nitro-quinazoline

Melting point: 80-100°C

Mass spectrum (ESI⁺): m/z = 627, 629 [M+H]⁺

(3) 4-[(3-bromophenyl)amino]-7-(3-{4-[2-(ethoxycarbonyl)ethyl]-piperazin-1-yl}propyloxy)-6-nitro-quinazoline

(reaction is carried out with ethyl acrylate in ethanol)

Melting point: 153-156°C

Mass spectrum (ESI⁺): m/z = 587, 589 [M+H]⁺

(4) 4-[(3-bromophenyl)amino]-7-(3-{4-[3-(ethoxycarbonyl)propyl]-piperazin-1-yl}propyloxy)-6-nitro-quinazoline

Melting point: 50-58°C

Mass spectrum (ESI⁺): m/z = 601, 603 [M+H]⁺

(5) 4-[(3-bromophenyl)amino]-7-(2-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}ethoxy)-6-nitro-quinazoline

Melting point: 103-120°C

Mass spectrum (ESI⁺): m/z = 559, 561 [M+H]⁺

- 80 -

(6) 4-[(3-bromophenyl)amino]-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}oxy)-6-nitro-quinazoline

Melting point: 151°C

Mass spectrum (ESI⁺): m/z = 530, 532 [M+H]⁺

(7) 4-[(3-bromophenyl)amino]-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}methoxy)-6-nitro-quinazoline

Melting point: 189°C

Mass spectrum (ESI⁺): m/z = 544, 546 [M+H]⁺

(8) 4-[(3-bromophenyl)amino]-7-(2-{1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}ethoxy)-6-nitro-quinazoline

Melting point: 185-187°C

Mass spectrum (ESI⁺): m/z = 558, 560 [M+H]⁺

(9) 4-[(3-bromophenyl)amino]-7-(3-{1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}propyloxy)-6-nitro-quinazoline

Melting point: 101°C

Mass spectrum (ESI⁺): m/z = 572, 574 [M+H]⁺

(10) 4-[(3-bromophenyl)amino]-7-(3-{4-[(butyloxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-nitro-quinazoline

Melting point: 70-75°C

Mass spectrum (ESI⁺): m/z = 601, 603 [M+H]⁺

Example III

4-[(3-bromophenyl)amino]-6-nitro-7-[3-(piperazin-1-yl)propyloxy]-quinazoline

15 ml of trifluoroacetic acid are added dropwise to a suspension of 7.05 g of 4-[(3-bromophenyl)amino]-6-nitro-7-{3-[4-(tert-butyloxycarbonyl)-piperazin-1-yl]propyloxy}-quinazoline in 80 ml of methylene chloride at ambient temperature with stirring. While gas is given off, a dark solution is rapidly formed which is stirred for approximately a further 1.5 hours at ambient temperature. The reaction solution is concentrated by evaporation using the rotary evaporator. The resin-like

- 81 -

residue is taken up in methylene chloride, combined with ice water and carefully made alkaline with 4N sodium hydroxide solution. Partially precipitated product is dissolved by the addition of more methylene chloride and methanol. The aqueous phase is separated off and extracted with methylene chloride/methanol (9:1). The combined extracts are washed with water, dried over magnesium sulphate and concentrated by evaporation. The crude product is heated to boiling with 25 ml of tert. butylmethylether, cooled with stirring and suction filtered. The yellow crystals thus obtained are washed with diethylether and dried.

Yield: 5.16 g (88 % of theory),

Melting point: 179-182°C

Mass spectrum (ESI⁺): m/z = 487, 489 [M+H]⁺

The following compounds are obtained analogously to Example III:

(1) 4-[(3-bromophenyl)amino]-6-nitro-7-[2-(piperazin-1-yl)ethoxy]-quinazoline

Melting point: 133-136°C

Mass spectrum (ESI⁺): m/z = 473, 475 [M+H]⁺

(2) 4-[(3-bromophenyl)amino]-6-nitro-7-[(piperidin-4-yl)oxy]-quinazoline

Melting point: 131°C

Mass spectrum (ESI⁺): m/z = 444, 446 [M+H]⁺

(3) 4-[(3-bromophenyl)amino]-6-nitro-7-[(piperidin-4-yl)methoxy]-quinazoline

Melting point: 145°C

Mass spectrum (ESI⁺): m/z = 458, 460 [M+H]⁺

(4) 4-[(3-bromophenyl)amino]-6-nitro-7-[2-(piperidin-4-yl)ethoxy]-quinazoline

Melting point: 228°C

Mass spectrum (ESI⁺): m/z = 472, 474 [M+H]⁺

- 82 -

(5) 4-[(3-bromophenyl)amino]-6-nitro-7-[3-(piperidin-4-yl)propyloxy]-quinazoline

Melting point: 194°C

Mass spectrum (ESI⁺): m/z = 486, 488 [M+H]⁺

(6) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-{[4-(piperazin-1-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

R_f value: 0.60 (reversed phase TLC-plate (E. Merck), acetonitrile/water/trifluoro-acetic acid = 50:50:1)

Mass spectrum (ESI⁺): m/z = 511, 513 [M+H]⁺

Example IV

4-[(3-bromophenyl)amino]-6-nitro-7-{3-[4-(tert-butyloxycarbonyl)-piperazin-1-yl]propyloxy}-quinazoline

1.08 g sodium hydride are added to a solution of 6.35 g of 3-[4-(tert-butyloxycarbonyl)-piperazin-1-yl]-propan-1-ol in 100 ml of tetrahydrofuran under a nitrogen atmosphere. The suspension is stirred for about 10 minutes at ambient temperature, then 4.72 g of 4-[(3-bromophenyl)amino]-7-fluoro-6-nitro-quinazoline in 20 ml of tetrahydrofuran are added thereto. The reaction mixture turns dark reddish-brown, while giving off gas, and is gently refluxed for about 25 minutes. Since only a partial reaction has taken place, a further 0.52 g of sodium hydride are added. The reaction mixture is heated for a further 40 minutes until the reaction has ended. The cooled reaction solution is poured onto about 250 ml of ice-water and neutralised with a little citric acid. The partially precipitated product is extracted with ethyl acetate. The combined extracts are washed with a little water, followed by saturated sodium chloride solution, dried over magnesium sulphate and concentrated by evaporation. 11.30 g of crude product is obtained as a dark resin which is heated to boiling with 25 ml of methanol with stirring, whereupon the product crystallises out. The suspension is cooled with ice-water and suction fil-

- 83 -

tered. The brownish-yellow crystals obtained are washed again with 10 ml of cold methanol and dried in the desiccator.

Yield: 7.08 g (92 % of theory),

Melting point: 152-156°C

Mass spectrum (ESI⁺): m/z = 587, 589 [M+H]⁺

The following compounds are obtained analogously to Example IV:

(1) 4-[(3-bromophenyl)amino]-6-nitro-7-{2-[4-(tert-butyloxy-carbonyl)-piperazin-1-yl]ethoxy}-quinazoline

Melting point: 219-222°C

Mass spectrum (ESI⁺): m/z = 573, 575 [M+H]⁺

(2) 4-[(3-bromophenyl)amino]-6-nitro-7-{[1-(tert-butyloxycar-bonyl)-piperidin-4-yl]oxy}-quinazoline

Melting point: 190°C

Mass spectrum (ESI⁻): m/z = 542, 544 [M-H]⁻

(3) 4-[(3-bromophenyl)amino]-6-nitro-7-{[1-(tert-butyloxycar-bonyl)-piperidin-4-yl]methoxy}-quinazoline

Melting point: 240°C

Mass spectrum (ESI⁺): m/z = 558, 560 [M+H]⁺

(4) 4-[(3-bromophenyl)amino]-6-nitro-7-{2-[1-(tert-butyloxy-carbonyl)-piperidin-4-yl]ethoxy}-quinazoline

Melting point: 208°C

Mass spectrum (ESI⁺): m/z = 572, 574 [M+H]⁺

(5) 4-[(3-bromophenyl)amino]-6-nitro-7-{3-[1-(tert-butyloxy-carbonyl)-piperidin-4-yl]propyloxy}-quinazoline

Melting point: 203°C

Mass spectrum (ESI⁻): m/z = 584, 586 [M-H]⁻

- 84 -

(6) 4-[(3-bromophenyl)amino]-7-[3-(tert-butyldimethylsilyloxy)-propyloxy]-6-nitro-quinazoline

R_f value: 0.84 (silica gel, petroleum ether/ethyl acetate = 1:1)

Mass spectrum (ESI⁺): m/z = 533, 535 [M+H]⁺

(7) 4-[(3-bromophenyl)amino]-7-[2-(tert-butyldimethylsilyloxy)-ethoxy]-6-nitro-quinazoline

Melting point: 206-208°C

Mass spectrum (ESI⁺): m/z = 519, 521 [M+H]⁺

(8) 4-[(3-chloro-4-fluorophenyl)amino]-7-cyclopropylmethoxy-6-nitro-quinazoline (carried out in dimethylformamide with potassium tert-butoxide as base)

Melting point: 211-213°C

Mass spectrum (ESI⁺): m/z = 389, 391 [M+H]⁺

(9) 4-[(3-bromophenyl)amino]-7-[4-(tert-butyldimethylsilyloxy)-butyloxy]-6-nitro-quinazoline

R_f value: 0.73 (silica gel, petroleum ether/ethyl acetate = 1:1)

Mass spectrum (ESI⁺): m/z = 545, 547 [M+H]⁺

(10) 4-[(3-chloro-4-fluorophenyl)amino]-7-cyclohexylmethoxy-6-nitro-quinazoline (carried out in dimethylformamide with potassium-tert. butoxide as base)

Melting point: 258°C

Mass spectrum (ESI⁺): m/z = 431, 433 [M+H]⁺

(11) 4-[(3-chloro-4-fluorophenyl)amino]-7-cyclohexyloxy-6-nitro-quinazoline (carried out in dimethylformamide with potassium-tert-butoxide as base)

Melting point: 196°C

Mass spectrum (ESI⁺): m/z = 417, 419 [M+H]⁺

- 85 -

(12) 4-[(3-chloro-4-fluorophenyl)amino]-7-cyclobutyloxy-6-nitro-quinazoline (carried out in dimethylformamide with potassium tert-butoxide as base)

Melting point: 230-231°C

Mass spectrum (ESI⁺): m/z = 389, 391 [M+H]⁺

(13) 4-[(3-chloro-4-fluorophenyl)amino]-7-cyclobutylmethoxy-6-nitro-quinazoline (carried out in dimethylformamide with potassium tert-butoxide as base)

Melting point: 223-225°C

Mass spectrum (ESI⁺): m/z = 403, 405 [M+H]⁺

(14) 4-[(3-chloro-4-fluorophenyl)amino]-7-cyclopentylmethoxy-6-nitro-quinazoline (carried out in dimethylformamide with potassium-tert. butoxide as base)

Melting point: 220-224°C

Mass spectrum (ESI⁺): m/z = 417, 419 [M+H]⁺

(15) 4-[(3-chloro-4-fluorophenyl)amino]-7-(2-cyclopropylethoxy)-6-nitro-quinazoline (carried out in dimethylformamide with potassium tert-butoxide as base)

Melting point: 200-202°C

Mass spectrum (ESI⁺): m/z = 403, 405 [M+H]⁺

(16) 4-[(3-chloro-4-fluorophenyl)amino]-7-cyclopentyloxy-6-nitro-quinazoline (carried out in dimethylformamide with potassium tert-butoxide as base)

Melting point: 224°C

Mass spectrum (ESI⁺): m/z = 403, 405 [M+H]⁺

(17) 4-[(3-chlorophenyl)amino]-7-methoxy-6-nitro-quinazoline (carried out with sodium methoxide in tetrahydrofuran)

Melting point: 199-201°C

Mass spectrum (ESI⁺): m/z = 331, 333 [M+H]⁺

- 86 -

(18) (R)-4-[(1-phenylethyl)amino]-7-methoxy-6-nitro-quinazoline (carried out with sodium methoxide in tetrahydrofuran)
 R_f value: 0.17 (silica gel, cyclohexane/ethyl acetate = 1:1)
Mass spectrum (ESI⁺): m/z = 325 [M+H]⁺

(19) 4-[(R)-(1-Phenyl-ethyl)amino]-7-[2-(tetrahydro-pyran-2-yloxy)-ethoxy]-6-nitro-quinazoline
 R_f value: 0.11 (silica gel, cyclohexane/ethyl acetate = 1:1)
Mass spectrum (EI): m/z = 438 [M]⁺

(20) 4-[(R)-(1-Phenyl-ethyl)amino]-7-[3-(tetrahydro-pyran-2-yloxy)-propyloxy]-6-nitro-quinazoline
 R_f value: 0.19 (silica gel, cyclohexane/ethyl acetate = 1:1)
Mass spectrum (EI): m/z = 452 [M]⁺

(21) 4-[(R)-(1-Phenyl-ethyl)amino]-7-[4-(tetrahydro-pyran-2-yloxy)-butyloxy]-6-nitro-quinazoline
 R_f value: 0.18 (silica gel, cyclohexane/ethyl acetate = 1:1)
Mass spectrum (ESI⁻): m/z = 465 [M-H]⁻

(22) 4-[(R)-(1-Phenyl-ethyl)amino]-7-cyclobutyloxy-6-nitro-quinazoline (reaction is carried out with potassium tert.butyrate in N,N-dimethyl-formamide)
 R_f value: 0.54 (silica gel, ethyl acetate)
Mass spectrum (ESI⁻): m/z = 363 [M-H]⁻

(23) 4-[(R)-(1-Phenyl-ethyl)amino]-7-cyclopentyloxy-6-nitro-quinazoline (reaction is carried out with potassium tert.butyrate in N,N-dimethyl-formamide)
 R_f value: 0.24 (silica gel, petroleum ether/ethyl acetate = 1:1)
Mass spectrum (ESI⁺): m/z = 379 [M+H]⁺

(24) 4-[(R)-(1-Phenyl-ethyl)amino]-7-cyclopropylmethoxy-6-nitro-quinazoline (reaction is carried out with potassium tert.butyrate in N,N-dimethyl-formamide)

- 87 -

Melting point: 155°C

Mass spectrum (ESI⁺): m/z = 365 [M+H]⁺

(25) 4-Benzylamino-7-cyclopropylmethoxy-6-nitro-quinazoline
(reaction is carried out with potassium tert.butylate in
N,N-dimethyl-formamide)

Melting point: 168°C

Mass spectrum (ESI⁺): m/z = 351 [M+H]⁺

Example V

4-[(3-bromophenyl)amino]-6-[(4-bromo-1-oxo-2-buten-1-yl)amino]-quinazoline

1.74 ml of oxalylchloride and one drop of dimethylformamide are added to a solution of 1.65 g of 4-bromo-2-butenic acid in 15 ml of methylene chloride at ambient temperature. The reaction mixture is stirred for about one hour at ambient temperature until the development of gas has ceased. The acid chloride formed is largely freed from the solvent *in vacuo* using the rotary evaporator. The oily brown crude product is taken up in 25 ml of tetrahydrofuran and added dropwise, while cooling with a ice bath, to a solution of 3.15 g of 4-[(3-bromophenyl)amino]-6-amino-quinazoline and 2.30 ml of Hünig base in 25 ml of tetrahydrofuran. The reaction mixture is stirred for 30 minutes while cooling with ice and then stirred for another 1.5 hours at ambient temperature. For working up, 25 ml of water and 50 ml of ethyl acetate are added. The organic phase is separated off, washed with saturated sodium chloride solution, dried over magnesium sulphate and concentrated by evaporation. The residue is boiled in 30 ml of ethyl acetate to purify it further and filtered while hot. The yellow crystalline product is washed with hot ethyl acetate and dried.

Yield: 3.00 g (65 % of theory),

R_f value: 0.33 (silica gel, methylene chloride/methanol/concentrated aqueous ammonia solution = 9:1:0.1)

Mass spectrum (ESI⁺): m/z = 463 [M+H]⁺

The following compound is obtained analogously to Example V:

(1) 4-[(3-bromophenyl)amino]-6-[(4-bromo-1-oxo-2-buten-1-yl)-amino]-7-methoxy-quinazoline

R_f value: 0.38 (reversed phase ready-made TLC plates (E. Merck), acetonitrile/water, trifluoroacetic acid = 50:50:1)

Example VI

3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propylamine-hydrochloride

20 ml of trifluoroacetic acid are added dropwise to a solution of 6.10 g of N-[3-(tert. butyloxycarbonylamino)-propyl]-sarcosine ethyl ester in 40 ml of methylene chloride whilst cooling with an ice bath. The reaction mixture is then stirred for about another three hours at 0°C until the evaluation of gas has ended. For working up, the solvent is largely distilled off *in vacuo* in the rotary evaporator. The residue is taken up in ethereal hydrochloric acid solution and again evaporated to dryness.

Yield: 4.72 g (86 % of theory),

R_f value: 0.80 (silica gel, acetonitrile/water/trifluoroacetic acid = 50:50:1)

Mass spectrum (EI): m/z = 174 [M]⁺

The following compound is obtained analogously to Example VI:

(1) 2-{N-[(ethoxycarbonyl)methyl]-N-methylamino}ethylamine-dihydrochloride

R_f value: 0.74 (Reversed phase ready-made TLC plate (E. Merck), acetonitrile/water/trifluoroacetic acid = 50:50:1)

Mass spectrum (ESI⁺): m/z = 161 [M+H]⁺

Example VIIN-[3-(tert-butyloxycarbonylamino)-propyl]-sarcosine ethyl ester

A solution of 17.90 g 3-(tert-butyloxycarbonylamino)propyl bromide in 50 ml of acetonitrile is added dropwise to a mixture of 11.55 g of sarcosine ethylester hydrochloride and 28.8 ml of Hünig base in 200 ml of acetonitrile within 30 minutes while cooling with an ice bath. The reaction mixture is allowed to come up to ambient temperature overnight in the ice bath. Then the solvent is distilled off using the rotary evaporator, the residue is taken up in tert-butyl-methylether and washed with ice water. The organic phase is dried over magnesium sulphate and concentrated by evaporation. The crude product is chromatographed on a silica gel column with methylene chloride/methanol/concentrated aqueous ammonia solution (100:2:0.1).

Yield: 20.62 g (30 % of theory),

R_f value: 0.50 (silica gel, methylene chloride/methanol/concentrated aqueous ammonia solution = 20:1:0.1)

Mass spectrum (ESI⁺): m/z = 275 [M+H]⁺

The following compound is obtained analogously to Example VII:

(1) N-[2-(tert.butyloxycarbonylamino)-ethyl]-sarcosine ethylester

R_f value: 0.45 (silica gel, methylene chloride/methanol/concentrated aqueous ammonia solution = 90:10:0.5)

Mass spectrum (ESI⁺): m/z = 261 [M+H]⁺

Example VIII4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)methyl]-piperazin-1-yl}propyloxy)-6-nitro-quinazoline

0.08 ml of a 37% formaldehyde solution is added to a suspension of 487 mg of 4-[(3-bromophenyl)amino]-6-nitro-7-[3-(pipe-

- 90 -

razin-1-yl)propyloxy]-quinazoline in 3 ml of dioxane. The suspension is briefly heated in an oil bath until a clear solution is obtained. Then 0.16 ml of diethylphosphite are pipetted in with stirring at ambient temperature. The reaction mixture is then stirred for a further half hour at ambient temperature, then heated to 90-100°C in an oil bath. After another three hours the reaction is complete. The reaction solution is concentrated by evaporation, the residue is stirred with ice-water, filtered off and dried in the desiccator. The crude product is purified by chromatography over a silica gel column with methylene chloride/ethanol (9:1).

Yield: 540 mg (85 % of theory),

Melting point: 140-143°C

Mass spectrum (ESI⁺): m/z = 637, 639 [M+H]⁺

Example IX

6-amino-4-[(3-bromophenyl)amino]-7-{3-[4-(carboxymethyl)-
piperazin-1-yl]propyloxy}-quinazoline

2.0 ml of 1.0 N sodium hydroxide solution are added to a solution of 440 mg of 6-amino-4-[(3-bromophenyl)amino]-7-(3-{4-[(butyloxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-quinazoline in 25 ml of tetrahydrofuran and 5 ml of methanol. The dark solution formed is stirred overnight at ambient temperature. The reaction mixture is neutralised with 2.0 ml of 1.0 N hydrochloric acid and freed from solvent in the rotary evaporator. The brown, resin-like residue is taken up in methylene chloride/methanol (9:1) and suction filtered. The filtrate is concentrated by evaporation, moistened with toluene and dried in the desiccator.

The brown crude product is reacted without any further purification.

Yield: 460 mg (116 % of theory)

R_f value: 0.50 (Reversed phase ready-made TLC plate (E. merck),
acetonitrile/water/trifluoroacetic acid
= 90:10:1)

Mass spectrum (ESI⁻): m/z = 513, 515 [M-H]⁻

- 91 -

The following compound is obtained analogously to Example IX:

(1) 4-[(3-chloro-4-fluorophenyl)amino]-6-[[(2-carboxy-vinyl)-carbonyl]amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.55 (Reversed phase ready-made TLC plate (E. Merck), acetonitrile/water/trifluoroacetic acid = 50:50:1)

Mass spectrum (ESI⁺): m/z = 457, 459 [M+H]⁺

Example X

4-[(3-Bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-6-nitro-quinazoline

A mixture of 1.40 g 4-[(3-bromophenyl)amino]-7-[3-(methylsulphonyloxy)-propyloxy]-6-nitro-quinazoline and 5.60 g sarcosine ethylester is stirred for 2.5 hours at 110°C. The reaction mixture is stirred with 100 ml of ice-water. The yellow supernatant emulsion is decanted and the orange-yellow mucilaginous precipitate is dissolved in methylene chloride, dried over sodium sulphate and concentrated by evaporation. The brownish-orange crude product is purified by chromatography over a silica gel column with methylene chloride/methanol (96:4).

Yield: 763 mg (52 % of theory)

R_f value: 0.65 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 518, 520 [M+H]⁺

The following compounds are obtained analogously to Example X:

(1) 4-[(3-bromophenyl)amino]-7-(2-{N-[(ethoxycarbonyl)methyl]-N-methylamino}ethoxy)-6-nitro-quinazoline

R_f value: 0.71 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 504, 506 [M+H]⁺

(2) 4-[(3-bromophenyl)amino]-7-(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}butyloxy)-6-nitro-quinazoline

R_f value: 0.55 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (EI): $m/z = 531, 533$ $[M]^+$

(3) 4-[(R)-(1-Phenyl-ethyl)amino]-7-{2-[2-(methoxycarbonyl)-piperidin-1-yl]-ethoxy}-6-nitro-quinazoline (reaction is carried out in acetonitrile in the presence of diisopropylethylamine and sodium iodide)

R_f value: 0.21 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (ESI⁻): $m/z = 478$ $[M-H]^-$

(4) 4-[(R)-(1-Phenyl-ethyl)amino]-7-{2-[(R)-2-(methoxycarbonyl)-pyrrolidin-1-yl]-ethoxy}-6-nitro-quinazoline (reaction is carried out in acetonitrile in the presence of diisopropylethylamine and sodium iodide)

R_f value: 0.25 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (ESI⁻): $m/z = 464$ $[M-H]^-$

(5) 4-[(R)-(1-Phenyl-ethyl)amino]-7-{2-[(S)-2-(methoxycarbonyl)-pyrrolidin-1-yl]-ethoxy}-6-nitro-quinazoline (reaction is carried out in acetonitrile in the presence of diisopropylethylamine and sodium iodide)

R_f value: 0.30 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (ESI⁻): $m/z = 464$ $[M-H]^-$

(6) 4-[(R)-(1-Phenyl-ethyl)amino]-7-{3-[(R)-2-(methoxycarbonyl)-pyrrolidin-1-yl]-propyloxy}-6-nitro-quinazoline (reaction is carried out in acetonitrile in the presence of diisopropylethylamine, potassium carbonate, and sodium iodide)

R_f value: 0.23 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (ESI⁻): $m/z = 478$ $[M-H]^-$

(7) 4-[(R)-(1-Phenyl-ethyl)amino]-7-{4-[2-(methoxycarbonyl)-piperidin-1-yl]-butyloxy}-6-nitro-quinazoline (reaction is carried out in acetonitrile in the presence of potassium carbonate and sodium iodide)

R_f value: 0.25 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (ESI⁻): $m/z = 506$ $[M-H]^-$

Mass spectrum (ESI⁺): m/z = 483, 485 [M+H]⁺

(2) 4-[(3-bromophenyl)amino]-7-[4-(methylsulphonyloxy)-butyloxy]-6-nitro-quinazoline

R_f value: 0.73 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 509, 511 [M-H]⁻

(3) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(tert-butyloxycarbonyl)methyl]-N-[2-(methylsulphonyloxy)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

R_f value: 0.65 (silica gel, methylene chloride/methanol = 9:1)

(4) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[2-(methylsulphonyloxy)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.68 (silica gel, ethyl acetate)

(5) 4-[(R)-(1-Phenyl-ethyl)amino]-7-[2-(methylsulfonyloxy)-ethoxy]-6-nitro-quinazoline

R_f value: 0.45 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (ESI⁻): m/z = 431 [M-H]⁻

(6) 4-[(R)-(1-Phenyl-ethyl)amino]-7-[3-(methylsulfonyloxy)-propyloxy]-6-nitro-quinazoline

R_f value: 0.40 (silica gel, methylene chloride/methanol = 95:5)

Mass spectrum (ESI⁻): m/z = 445 [M-H]⁻

(7) 4-[(R)-(1-Phenyl-ethyl)amino]-7-[4-(methylsulfonyloxy)-butyloxy]-6-nitro-quinazoline

R_f value: 0.45 (silica gel, methylene chloride/methanol = 95:5)

Example XII

4-[(3-Bromophenyl)amino]-7-(3-hydroxy-propyloxy)-6-nitro-quinazoline

5.60 g tetrabutylammonium fluoride-trihydrate are added to 2.50 g of 4-[(3-bromophenyl)amino]-7-[3-(tert. butyldimethyl-

(8) 4-[(R)-(1-Phenyl-ethyl)amino]-7-(2-{N-[(methoxycarbonyl)-methyl]-N-methylamino}-ethoxy)-6-nitro-quinazoline (reaction is carried out in acetonitrile in the presence of diisopropyl-ethylamine and sodium iodide)
R_f value: 0.35 (silica gel, methylene chloride/methanol = 95:5)
Mass spectrum (ESI⁻): m/z = 438 [M-H]⁻

Example XI

4-[(3-Bromophenyl)amino]-7-[3-(methylsulphonyloxy)-propyloxy]-6-nitro-quinazoline

1.10 ml of triethylamine are added to 1.28 g of 4-[(3-bromophenyl)amino]-7-(3-hydroxy-propyloxy)-6-nitro-quinazoline in 55 ml of methylene chloride. Then, whilst cooling with an ice bath, a solution of 0.47 ml of methanesulphonic acid chloride in 5 ml of methylene chloride is added dropwise. The reaction mixture is stirred for about one hour at ambient temperature. Since some starting material can still be detected, another 20 drops of triethylamine and 10 drops of methanesulphonic acid chloride are added, whilst cooling with an ice bath. The mixture is stirred for a further 30 minutes at ambient temperature, whereupon a clear, reddish-orange solution is formed. For work-up, this is diluted with methylene chloride and added to 100 ml of water. The organic phase is washed with 3 % sodium hydrogen carbonate solution and water, dried over sodium sulphate and concentrated by evaporation. A brownish-yellow resin remains, which is further reacted as the crude product.
Yield: 1.4 g (92 % of theory)
R_f value: 0.70 (silica gel, methylene chloride/methanol = 9:1)

The following compounds are obtained analogously to Example XI:

(1) 4-[(3-bromophenyl)amino]-7-[2-(methylsulphonyloxy)-ethoxy]-6-nitro-quinazoline

R_f value: 0.73 (silica gel, methylene chloride/methanol = 9:1)

silyloxy)-propyloxy]-6-nitro-quinazoline in 25 ml of tetrahydrofuran. The reaction mixture is stirred for about 2 hours at ambient temperature. After the cleavage is complete, the reaction mixture is combined with 150 ml of a 2 % ammonium chloride solution and cooled in the ice bath. A yellow precipitate is formed which is suction filtered and washed with water. The precipitate, while still damp, is dissolved in methylene chloride/methanol (6:4), dried over sodium sulphate and concentrated by evaporation. The yellow residue is stirred with a little petroleum ether and suction filtered, washed with petroleum ether and dried in vacuo.

Yield: 1.29 g (66 % of theory)

R_f value: 0.63 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 417, 419 [M-H]⁻

The following compounds are obtained analogously to Example XII:

(1) 4-[(3-bromophenyl)amino]-7-(2-hydroxy-ethoxy)-6-nitro-quinazoline

R_f value: 0.66 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 405, 407 [M+H]⁺

(2) 4-[(3-bromophenyl)amino]-7-(4-hydroxy-butyloxy)-6-nitro-quinazoline

R_f value: 0.62 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 431, 433 [M-H]⁻

Example XIII

4-[(3-chlorophenyl)amino]-7-fluoro-6-nitro-quinazoline

A solution of 2.76 ml of 3-chloroaniline in 7 ml of dioxan is added dropwise to 5.0 g of 4-chloro-7-fluoro-6-nitro-quinazoline in 40 ml of methylene chloride at 15°C within 15 minutes. The reaction mixture is stirred for a further 15 minutes at this temperature before being poured onto 100 ml of n-hexane for working up. The mixture is stirred for about one hour

- 96 -

while cooling with an ice bath, then the precipitate formed is filtered off. The hydrochloride thus obtained is suspended in 30 ml of methanol, made alkaline with triethylamine while cooling with an ice bath and combined with 100 ml of water. The precipitate formed is suction filtered and washed with water. The crude product is purified by chromatography on a silica gel column with methylene chloride/methanol (20:1) as eluant.

Yield: 3.50 g (50 % of theory),

Melting point: 223-225°C

Mass spectrum (ESI⁺): m/z = 319, 321 [M+H]⁺

The following compounds are obtained analogously to Example XIII:

(1) (R)-4-[(1-phenylethyl)amino]-7-fluoro-6-nitro-quinazoline

Melting point: 204-206°C

Mass spectrum (ESI⁺): m/z = 313 [M+H]⁺

(2) 4-Benzylamino-7-fluoro-6-nitro-quinazoline

Melting point: 223-225°C

Mass spectrum (ESI⁺): m/z = 299 [M+H]⁺

Example XIV

4-[(3-chloro-4-fluorophenyl)amino]-6-[(3-ethoxycarbonyl-1-oxo-2-propen-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

A solution of 3.00 g of ethyl 3-chlorocarbonyl-acrylate in 50 ml of tetrahydrofuran is added dropwise to 5.00 g of 6-amino-4-[(3-chloro-4-fluorophenyl)amino]-7-cyclopropylmethoxy-quinazoline and 3.5 ml of diisopropylethylamine in 150 ml of tetrahydrofuran while cooling with an ice bath. The reaction mixture is stirred for a further hour while cooling with an ice bath and then stirred overnight at ambient temperature. Next, the solvent is largely distilled off in the rotary evaporator and the residue is partitioned between water and ethyl acetate. The organic phase is washed with saturated

- 97 -

sodium chloride solution, dried over magnesium sulphate and concentrated by evaporation. The brown, oily crude product is stirred with diethylether, the precipitate formed is suction filtered and washed with a little diethylether.

Yield: 3.20 g (47 % of theory),

R_f value: 0.80 (silica gel, ethyl acetate)

Mass spectrum (ESI⁺): m/z = 485, 487 [M+H]⁺

Example XV

4-[(R)-(1-Phenyl-ethyl)amino]-7-(2-hydroxy-ethoxy)-6-nitro-quinazoline

To a stirred solution of 7.70 g 4-[(R)-(1-phenyl-ethyl)amino]-7-[2-(tetrahydro-pyran-2-yloxy)-ethoxy]-6-nitro-quinazoline in 120 ml of methanol are added 2 ml of concentrated hydrochloric acid. The reaction mixture is stirred for 1.5 hours at 50°C. After cooling, the mixture is neutralized with solid sodium bicarbonate and concentrated *in vacuo*. The solid residue is dissolved in ethyl acetate, washed with concentrated aqueous sodium bicarbonate solution, dried over magnesium sulfate, and concentrated. The residue is triturated with 30 ml of diethyl ether, filtered off with suction, and dried.

Yield: 4.34 g (88 % of theory),

Melting point: 187-192°C

Mass spectrum (ESI⁺): m/z = 355 [M+H]⁺

The following compounds are obtained analogously to Example XV:

(1) 4-[(R)-(1-Phenyl-ethyl)amino]-7-(3-hydroxy-propyloxy)-6-nitro-quinazoline

Melting point: 178-183°C

Mass spectrum (ESI⁺): m/z = 369 [M+H]⁺

- 98 -

(2) 4-[(R)-(1-Phenyl-ethyl)amino]-7-(4-hydroxy-butyloxy)-
6-nitro-quinazoline

Melting point: 143-146°C

Mass spectrum (ESI⁺): m/z = 383 [M+H]⁺

Example XVI

4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[4-(tert.butyloxy-carbonyl)-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

4.7 ml of oxalyl dichloride are added to a solution of 4.51 g 4-bromo-but-2-enoic acid in 100 ml of methylene chloride at room temperature. After addition of one drop of N,N-dimethyl-formamide, the reaction mixture is stirred for approximately 45 minutes until the gas evolution has ceased. The solvent is distilled off *in vacuo* to give the crude acid chloride.

In the meantime, a mixture of 7.00 g 6-amino-4-[(3-chloro-4-fluoro-phenyl)amino]-7-cyclopropylmethoxy-quinazoline and 10.2 ml diisopropylethylamine in 250 ml tetrahydrofuran is cooled to 0°C in an ice/water bath. The crude 4-bromo-but-2-enoic acid chloride is dissolved in 20 ml of methylene chloride and added dropwise to this mixture within 5 minutes. After stirring for 45 minutes at 0°C and one hour at room temperature, 18.17 g of piperazine-1-carboxylic acid tert.butyl ester suspended in 5 ml of N,N-dimethyl-formamide are added. After stirring for 48 hours at room temperature, the solvent is distilled off *in vacuo* and the residue is partitioned between 100 ml of water and 200 ml of ethyl acetate. The aqueous layer is extracted with ethyl acetate, the combined organic layers are washed with concentrated aqueous sodium chloride solution, dried over magnesium sulfate, and concentrated *in vacuo*. The crude product is purified by column chromatography on silica gel with ethyl acetate/methanol (15:1 to 9:1).

Yield: 5.2 g (44 % of theory),

R_f value: 0.42 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 609, 611 [M-H]⁻

The following compound is obtained analogously to Example XVI:

(1) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[2-(ethoxycarbonyl)-4-(tert.butyloxycarbonyl)-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline (The starting material 1-(tert.butyloxycarbonyl)-3-(ethoxycarbonyl)-piperazine was obtained by treatment of piperazine-2-carboxylic acid ethyl ester with tert.butyl carbonic anhydride in ethanol.)

R_f value: 0.26 (silica gel, ethyl acetate/cyclohexane = 7:3)

Mass spectrum (ESI⁺): m/z = 683, 685 [M+H]⁺

Example XVII

Ethyl [4-(1,1-Dimethyl-2-oxo-ethyl)-piperazin-1-yl]-acetate

A solution of 10.0 g 2-bromo-2-methyl-propionaldehyde in 20 ml of ethanol is added dropwise to a mixture of 25.0 g N-[(ethoxycarbonyl)methyl]-piperazine in 80 ml of ethanol at room temperature. The resulting mixture is stirred for 72 hours, concentrated in vacuo, and submitted directly to column chromatography on silica gel with methylene chloride/methanol (95:5 to 80:20) to give the title compound as a yellow oil.

Yield: 10.0 g (62 % of theory),

R_f value: 0.60 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 241 [M-H]⁻

Example XVIII

4-[(3-Chloro-4-fluoro-phenyl)amino]-6-([2-(diethoxyphosphoryl)-1-oxo-ethyl]amino)-7-cyclopropylmethoxy-quinazoline

137 mg (diethoxyphosphoryl)-acetic acid and 225 mg benzo-triazol-1-yl-N,N,N',N'-tetramethyluronium tetrafluoroborate are added subsequently to a solution of 200 mg 6-amino-4-[(3-chloro-4-fluoro-phenyl)amino]-7-cyclopropylmethoxy-quinazoline and 0.11 ml triethylamine in 1 ml of anhydrous N,N-dimethyl-formamide. The reaction mixture is stirred for one hour at

room temperature, quenched with 10 ml of water, and extracted with ethyl acetate/methanol (10:1). The combined extracts are washed with water and brine, dried over magnesium sulfate, and concentrated *in vacuo*. The crude product is recrystallized from diethyl ether.

Yield: 190 mg (64 % of theory),

Melting point: 185-187°C

Mass spectrum (ESI⁺): m/z = 537, 539 [M+H]⁺

Preparation of the end products:

Example 1

4-[(3-Bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline
440 mg of 6-amino-4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-quinazoline are suspended in 20 ml of methylene chloride at ambient temperature and combined with 0.24 ml of triethylamine under a nitrogen atmosphere. The reaction mixture is cooled to -10°C with an ice/sodium chloride bath, then a solution of 84 mg of acrylic acid chloride in 5 ml of methylene chloride is added dropwise within about 10 minutes. After another 10 minutes the reaction is complete. The reaction solution is washed with a little dilute potassium carbonate solution and water, dried and concentrated by evaporation. 526 mg of crude product are obtained as a brown resin which is purified by chromatography on a silica gel column with methylene chloride/ethanol (95:5). Yield: 300 mg (62 % of theory),
Melting point: 110-113°C
Mass spectrum (ESI⁺): m/z = 597, 599 [M+H]⁺

The following compounds are obtained analogously to Example 1:

(1) 4-[(3-bromophenyl)amino]-7-(3-{4-[(isopropoxyloxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline
Melting point: 95-100°C
Mass spectrum (ESI⁺): m/z = 611, 613 [M+H]⁺

(2) 4-[(3-bromophenyl)amino]-7-(3-{4-[(cyclohexyloxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline
Melting point: 96-104°C
Mass spectrum (ESI⁺): m/z = 651, 653 [M+H]⁺

- 102 -

(3) 4-[(3-bromophenyl)amino]-7-(3-{4-[2-(ethoxycarbonyl)-ethyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

Melting point: 97-102°C

Mass spectrum (ESI⁺): m/z = 611, 613 [M+H]⁺

(4) 4-[(3-bromophenyl)amino]-7-(3-{4-[3-(ethoxycarbonyl)propyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

Melting point: 107-111°C

Mass spectrum (ESI⁺): m/z = 625, 627 [M+H]⁺

(5) 4-[(3-bromophenyl)amino]-7-(2-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}ethoxy)-6-[(vinylcarbonyl)amino]-quinazoline

Melting point: 75-79°C

Mass spectrum (ESI⁺): m/z = 583, 585 [M+H]⁺

(6) 4-[(3-bromophenyl)amino]-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}oxy)-6-[(vinylcarbonyl)amino]-quinazoline

Melting point: 95°C

Mass spectrum (ESI⁺): m/z = 554, 556 [M+H]⁺

(7) 4-[(3-bromophenyl)amino]-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}methoxy)-6-[(vinylcarbonyl)amino]-quinazoline

Melting point: 141°C

Mass spectrum (ESI⁺): m/z = 568, 570 [M+H]⁺

(8) 4-[(3-bromophenyl)amino]-7-(2-{1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}ethoxy)-6-[(vinylcarbonyl)amino]-quinazoline

Melting point: 156°C

Mass spectrum (ESI⁺): m/z = 582, 584 [M+H]⁺

(9) 4-[(3-bromophenyl)amino]-7-(3-{1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

Melting point: 124°C

Mass spectrum (ESI⁺): m/z = 596, 598 [M+H]⁺

(10) 4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)-methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

Melting point: 80-85°C

Mass spectrum (ESI⁺): m/z = 661, 663 [M+H]⁺

(11) 4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)-methyl]-piperazin-1-yl}propyloxy)-6-[(1-oxo-2-butyne-1-yl)amino]-quinazoline (the reaction is carried out with 2-butyne-carboxylic acid and isobutyl chloroformate in tetrahydrofuran)

Melting point: 137-139°C

Mass spectrum (ESI⁺): m/z = 673, 675 [M+H]⁺

(12) 4-[(3-bromophenyl)amino]-7-(3-{4-[(butyloxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

R_f value: 0.53 (silica gel, methylene chloride/methanol/concentrated aqueous ammonia solution = 90:10:1)

Mass spectrum (ESI⁺): m/z = 625, 627 [M+H]⁺

(13) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

R_f value: 0.68 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 542, 544 [M+H]⁺

(14) 4-[(3-bromophenyl)amino]-7-(2-{N-[(ethoxycarbonyl)methyl]-N-methylamino}ethoxy)-6-[(vinylcarbonyl)amino]-quinazoline

R_f value: 0.71 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 528, 530 [M+H]⁺

(15) 4-[(3-bromophenyl)amino]-7-(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}butyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

R_f value: 0.67 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (EI): m/z = 555, 557 [M]⁺

- 104 -

(16) 4-[(R)-(1-Phenyl-ethyl)amino]-7-{2-[2-(methoxycarbonyl)-piperidin-1-yl]-ethoxy}-6-[(vinylcarbonyl)amino]-quinazoline
R_f value: 0.70 (silica gel, methylene chloride/methanol/
concentrated aqueous ammonia = 90:10:1)
Mass spectrum (ESI⁻): m/z = 502 [M-H]⁻

(17) 4-[(R)-(1-Phenyl-ethyl)amino]-7-{2-[(R)-2-(methoxycarbonyl)-pyrrolidin-1-yl]-ethoxy}-6-[(vinylcarbonyl)amino]-quinazoline
R_f value: 0.30 (silica gel, methylene chloride/methanol = 95:5)
Mass spectrum (ESI⁻): m/z = 488 [M-H]⁻

(18) 4-[(R)-(1-Phenyl-ethyl)amino]-7-{2-[(S)-2-(methoxycarbonyl)-pyrrolidin-1-yl]-ethoxy}-6-[(vinylcarbonyl)amino]-quinazoline
R_f value: 0.32 (silica gel, methylene chloride/methanol = 95:5)
Mass spectrum (ESI⁻): m/z = 488 [M-H]⁻

(19) 4-[(R)-(1-Phenyl-ethyl)amino]-7-{3-[(R)-2-(methoxycarbonyl)-pyrrolidin-1-yl]-propyloxy}-6-[(vinylcarbonyl)amino]-quinazoline
R_f value: 0.30 (silica gel, methylene chloride/methanol = 95:5)
Mass spectrum (ESI⁻): m/z = 502 [M-H]⁻

(20) 4-[(R)-(1-Phenyl-ethyl)amino]-7-{4-[2-(methoxycarbonyl)-piperidin-1-yl]-butyloxy}-6-[(vinylcarbonyl)amino]-quinazoline
R_f value: 0.27 (silica gel, methylene chloride/methanol = 95:5)
Mass spectrum (ESI⁺): m/z = 532 [M+H]⁺

(21) 4-[(R)-(1-Phenyl-ethyl)amino]-7-(2-{N-[(methoxycarbonyl)-methyl]-N-methylamino}-ethoxy)-6-[(vinylcarbonyl)amino]-quinazoline
R_f value: 0.30 (silica gel, methylene chloride/methanol = 95:5)
Mass spectrum (ESI⁺): m/z = 464 [M+H]⁺

Example 2

4-[(3-Bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinazoline

13.94 ml of Hünig base are pipetted into a suspension of 9.37 g of sarcosine ethylester hydrochloride in 25 ml of tetrahydrofuran while cooling with an ice bath. Then a solution of 2.00 g of 4-[(3-bromophenyl)amino]-6-[(4-bromo-1-oxo-2-buten-1-yl)amino]-quinazoline in 10 ml of dimethylformamide is added dropwise within 15 minutes. The reaction mixture is allowed to come up to ambient temperature overnight in an ice bath. For working up, 25 ml of saturated sodium hydrogen carbonate solution and 50 ml of ethyl acetate are added. The organic phase is separated off and the aqueous phase is extracted with ethyl acetate. The combined organic phases are washed with saturated sodium chloride solution, dried over magnesium sulphate and concentrated by evaporation. The dark-brown oily residue is stirred with 50 ml of water, the precipitate formed is suction filtered and washed with water. The crude product is purified by chromatography on a silica gel column with methylene chloride/methanol (50:1 to 20:1).

Yield: 1.00 g (46 % of theory),

Melting point: 182-183°C

Mass spectrum (ESI⁻): m/z = 496, 498 [M-H]⁻

The following compounds are obtained analogously to Example 2:

(1) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

Melting point: 121-125°C

Mass spectrum (EI): m/z = 527, 529 [M]⁺

(2) 4-[(3-bromophenyl)amino]-6-[(4-{N,N-bis[(ethoxycarbonyl)methyl]-amino}-1-oxo-2-buten-1-yl)amino]-quinazoline

Melting point: 150-154°C

Mass spectrum (EI): m/z = 541, 543 [M]⁺

- 106 -

(3) 4-[(3-bromophenyl)amino]-6-({4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-methoxy-quinazoline
 R_f value: 0.43 (silica gel, methylene chloride/methanol = 9:1)
 Mass spectrum (ESI⁺): m/z = 539, 541 [M+H]⁺

(4) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(diethoxyphosphoryl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline
 R_f value: 0.38 (silica gel, methylene chloride/methanol = 9:1)
 Mass spectrum (ESI⁻): m/z = 590, 592 [M-H]⁻

(5) 4-[(3-bromophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]quinazoline
 R_f value: 0.37 (silica gel, methylene chloride/methanol = 9:1)
 Mass spectrum (ESI⁺): m/z = 553, 555 [M+H]⁺

(6) 4-[(3-bromophenyl)amino]-6-[(4-{N-[1,2-bis(methoxycarbonyl)-ethyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline (reaction took place in acetonitrile under reflux)
 R_f value: 0.50 (silica gel, ethyl acetate/methanol = 15:1)
 Mass spectrum (EI): m/z = 585, 587 [M]⁺

Example 3

4-[(3-Bromophenyl)amino]-6-{[4-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-
quinazoline

106 mg of benzotriazol-1-yl-N-tetramethyl-uronium-tetrafluoroborate and 68 mg of 1-hydroxybenzotriazole are added to a solution of 200 mg of 4-[(3-bromophenyl)amino]-6-{[(2-carboxyvinyl)carbonyl]amino}-quinazoline in 2.5 ml of dimethyl-formamide. The solution is stirred for 20 minutes at ambient temperature, then 0.5 ml of Hünig's base and 148 mg of 3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propylamine,

- 107 -

dissolved in 0.5 ml of dimethylformamide, are added. The reaction mixture is stirred for a further two hours at ambient temperature before being poured onto 50 ml of water for working up. The aqueous phase is extracted with ethyl acetate, the combined organic phases are washed with saturated sodium chloride solution, dried over magnesium sulphate and concentrated by evaporation. The crude product is purified by chromatography on a silica gel column with methylene chloride/ethanol (20:1 to 9:1).

Yield: 106 mg (39 % of theory),

Melting point: 278-279°C

Mass spectrum (ESI⁺): m/z = 569, 571 [M+H]⁺

The following compounds are obtained analogously to Example 3:

(1) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

Melting point: 155-158°C

Mass spectrum (EI): m/z = 612, 614 [M]⁺

(2) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(2-{N-[(ethoxycarbonyl)methyl]-N-methylamino}ethylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

R_f value: 0.56 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 599, 601 [M+H]⁺

(3) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-{[4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1,4-dioxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

Melting point: 199°C

Mass spectrum (ESI⁻): m/z = 609, 611 [M-H]⁻

(4) (S)-4-[(3-Chloro-4-fluoro-phenyl)amino]-6-{[4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1,4-dioxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

R_f value: 0.57 (silica gel, ethyl acetate/methanol = 95:5)

Mass spectrum (ESI⁻): m/z = 566, 568 [M-H]⁻

Example 4

4-[(3-Bromophenyl)amino]-6-({4-[(tert-butylcarbonyloxy)methoxy]-1,4-dioxo-2-buten-1-yl}amino) quinazoline

207 mg of potassium carbonate and 0.144 ml of chloromethyl pivalate are added to 200 mg of 4-[(3-bromophenyl)amino]-6-[(2-carboxy-vinyl)carbonyl]amino}-quinazoline in 2 ml of dimethylsulphoxide. Then a further 30 mg of sodium iodide are added and the reaction mixture is stirred for 48 hours at ambient temperature. For working up, the reaction mixture is diluted with 20 ml of water and extracted with ethyl acetate. The combined extracts are washed with saturated sodium chloride solution, dried over magnesium sulphate and concentrated by evaporation. The crude product mixture is purified by chromatography on a silica gel column with methylene chloride/methanol (20:1).

Yield: 10 mg (4 % of theory),

R_f value: 0.42 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (EI): m/z = 526 [M]⁺

The following compounds are obtained analogously to Example 4:

(1) 4-[(3-bromophenyl)amino]-6-({4-[1-(ethyloxycarbonyloxy)-ethoxy]-1,4-dioxo-2-buten-1-yl}amino) quinazoline (the reaction is carried out in dimethylformamide)

R_f value: 0.43 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 529, 531 [M+H]⁺

(2) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-(4-[(tert-butylcarbonyloxy)methoxycarbonyl]methyl}-piperazin-1-yl)-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline (by reaction of the compound of Example 9(1) with chloromethyl pivalate in N,N-dimethyl-formamide in the presence of triethylamine)

R_f value: 0.50 (silica gel, methylene chloride/methanol = 9:1)

- 109 -

Mass spectrum (ESI⁻): m/z = 681, 683 [M-H]⁻

Example 5

4-[(3-methylphenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

0.86 ml of oxalylchloride and one drop of dimethylformamide are added to a solution of 842 mg of 4-bromo-2-butenic acid in 15 ml of methylene chloride at ambient temperature. The reaction mixture is stirred for about a further hour at ambient temperature until the evolution of gas has ended. The acid chloride formed is largely freed from solvent in the rotary evaporator *in vacuo*. Then the crude product is taken up in 10 ml of methylene chloride and, while cooling with an ice bath, added dropwise within five minutes to a mixture of 1.0 g of 6-amino-4-[(3-methylphenyl)amino]-7-methoxy-quinazoline and 2.0 ml of Hünig's base in 50 ml of tetrahydrofuran. The reaction mixture is stirred for two hours whilst cooling with an ice bath and for a further two hours at ambient temperature.

6.7 ml of Hünig base, 5.48 g of sarcosine ethylester hydrochloride and 3 ml of dimethylformamide are then added and the resulting mixture is stirred overnight at ambient temperature. For working up, the reaction mixture is concentrated by evaporation in the rotary evaporator *in vacuo* and the residue from the flask is partitioned between 75 ml of ethyl acetate and 75 ml of water. The organic phase is washed with water and saturated sodium chloride solution, dried over magnesium sulphate and concentrated by evaporation. The crude product is purified by chromatography on a silica gel column with methylene chloride/methanol (20 : 1).

Yield: 326 mg (20 % of theory)

Melting point: 122-124°C

Mass spectrum (ESI⁺): m/z = 464 [M+H]⁺

The following compounds are obtained analogously to Example 5:

- 110 -

(1) 4-[(3-chlorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

Melting point: 118-120°C

Mass spectrum (ESI⁺): m/z = 484 [M+H]⁺

(2) (R)-4-[(1-phenylethyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

R_f value: 0.49 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 478 [M+H]⁺

(3) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(methoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

Melting point: 197-199°C

Mass spectrum (EI): m/z = 513, 515 [M]⁺

(4) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(butyloxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

Melting point: 120-123°C

Mass spectrum (EI): m/z = 555, 557 [M]⁺

(5) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(cyclohexyloxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(The sarcosine cyclohexylester used was obtained by treating sarcosine in cyclohexanol with gaseous hydrochloric acid)

Melting point: 124-125°C

Mass spectrum (ESI⁺): m/z = 582, 584 [M+H]⁺

(6) 4-[(3-bromophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

Melting point: 147-150°C

Mass spectrum (ESI⁺): m/z = 583, 585 [M+H]⁺

- 111 -

(7) 4-[(3-bromophenyl)amino]-6-[(4-{4-[(isopropoxyloxycarbonyl)-methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(The isopropyl piperazin-1-yl-acetate used was obtained from N-benzylpiperazine by reacting with isopropyl bromoacetate and subsequently cleaving the benzyl group by hydrogenolysis.)

Melting point: 125-127°C

Mass spectrum (ESI⁺): m/z = 597, 599 [M+H]⁺

(8) 4-[(3-bromophenyl)amino]-6-({4-[N-(2,2-dimethoxyethyl)-N-methylamino]-1-oxo-2-buten-1-yl}amino)-7-methoxy-quinazoline

Melting point: 135-137°C

Mass spectrum (ESI⁺): m/z = 530, 532 [M+H]⁺

(9) 4-[(3-bromophenyl)amino]-6-({4-[N-(1,3-dioxolan-2-yl-methyl)-N-methylamino]-1-oxo-2-buten-1-yl}amino)-7-methoxy-quinazoline

Melting point: 120-123°C

Mass spectrum (ESI⁺): m/z = 528, 530 [M+H]⁺

(10) 4-[(3-bromophenyl)amino]-6-{[4-(2-ethoxy-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

Melting point: 118-120°C

Mass spectrum (ESI⁺): m/z = 542, 544 [M+H]⁺

(11) 4-[(3-bromophenyl)amino]-6-{[4-(2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

R_f value: 0.43 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (EI): m/z = 511, 513 [M]⁺

(12) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinoline

Melting point: 156°C

Mass spectrum (ESI⁺): m/z = 522, 524 [M+H]⁺

- 112 -

(13) 4-[(3-bromophenyl)amino]-6-[(4-[N,N-bis(2,2-diethoxyethyl)amino]-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline
 R_f value: 0.43 (aluminium oxide, cyclohexane/ethyl acetate = 1:1)

Mass spectrum (ESI⁺): m/z = 660, 662 [M+H]⁺

(14) 4-[(3-bromophenyl)amino]-6-[(4-{4-[bis(methoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-quinazoline

(The N-bis(methoxycarbonyl)methyl-piperazine used is obtained by reacting N-tert-butyloxycarbonyl-piperazine with dimethyl bromomalonate and subsequently cleaving the BOC protecting group.)

R_f value: 0.45 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 597, 599 [M+H]⁺

(15) 4-[(3-bromophenyl)amino]-6-[(4-{4-[1,2-bis(methoxycarbonyl)ethyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-quinazoline

(The N-[1,2-bis(methoxycarbonyl)ethyl]-piperazine used is obtained by reacting N-benzylpiperazine with dimethyl maleinate and subsequently cleaving the benzyl protecting group by hydrogenolysis.)

R_f value: 0.51 (silica gel, ethyl acetate/methanol = 9:1)

(16) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(tert. butyloxycarbonyl)methyl]-N-(2-hydroxyethyl)amino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

R_f value: 0.45 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 584, 586 [M-H]⁻

(17) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

Melting point: 113-118°C

- 113 -

Mass spectrum (EI): $m/z = 541, 543 [M]^+$

(18) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

Melting point: 115-117°C

Mass spectrum (EI): $m/z = 596, 598 [M]^+$

(19) 4-[(3-bromophenyl)amino]-6-[(4-{4-[1,3-bis(methoxycarbonyl)prop-2-yl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-quinazoline

R_f value: 0.62 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁺): $m/z = 625, 627 [M+H]^+$

(20) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[1,1-bis(methoxycarbonyl)-methyl]-N-methylamino}-1-oxo-2-buten-1-yl)-amino]-7-cyclopropylmethoxy-quinazoline

Melting point: 120-125°C

Mass spectrum (EI): $m/z = 585, 587 [M]^+$

(21) 4-[(3-bromophenyl)amino]-6-[(4-{4-[(diethoxyphosphoryl)-methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-quinazoline
(The N-[(diethoxyphosphoryl)methyl]-piperazine used is obtained by reacting N-benzylpiperazine with formaldehyde and diethyl phosphorate and subsequently cleaving the benzyl protecting group by hydrogenolysis.)

R_f value: 0.18 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁺): $m/z = 617, 619 [M+H]^+$

(22) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[2-(ethoxycarbonyl)-ethyl]-N-[(ethoxycarbonyl)methyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.62 (aluminium oxide, cyclohexane/ethyl acetate = 1:1)

Mass spectrum (EI): $m/z = 627, 629 [M]^+$

- 114 -

(23) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(tert-butyl-oxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.42 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 625, 627 [M+H]⁺

(24) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N,N-bis[2-(ethoxycarbonyl)-ethyl]-amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.37 (aluminium oxide, cyclohexane/ethyl acetate = 1:1)

Mass spectrum (ESI⁺): m/z = 642, 644 [M+H]⁺

(25) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

Melting point: 230-232°C

Mass spectrum (EI): m/z = 525, 527 [M]⁺

(26) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-(2-hydroxyethyl)amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.25 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (EI): m/z = 571, 573 [M]⁺

(27) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclohexylmethoxy-quinazoline

Melting point: 110-114°C

Mass spectrum (EI): m/z = 638, 640 [M]⁺

(28) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclohexyloxy-quinazoline

Melting point: 117°C

Mass spectrum (EI): m/z = 624, 626 [M]⁺

- 115 -

(29) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclobutyloxy-quinazoline

Melting point: 194-195°C

Mass spectrum (EI): m/z = 596, 598 $[M]^+$

(30) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclobutylmethoxy-quinazoline

R_f value: 0.53 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (EI): m/z = 610, 612 $[M]^+$

(31) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopentylmethoxy-quinazoline

R_f value: 0.53 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (EI): m/z = 624, 626 $[M]^+$

(32) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-(2-cyclopropylethoxy)-quinazoline

R_f value: 0.53 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (EI): m/z = 610, 612 $[M]^+$

(33) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopentyloxy-quinazoline

R_f value: 0.35 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (EI): m/z = 610, 612 $[M]^+$

(34) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-(2-hydroxy-2-methyl-propyl)amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.42 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 600, 602 $[M+H]^+$

- 116 -

(35) 4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[2-(methoxycarbonyl)-piperidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

R_f value: 0.42 (silica gel, ethyl acetate)

Mass spectrum (ESI⁺): m/z = 568, 570 [M+H]⁺

(36) (S)-4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

Melting point: 135-138°C

Mass spectrum (EI): m/z = 553, 555 [M]⁺

(37) 4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[N,N-bis[(methoxycarbonyl)methyl]amino}-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

Melting point: 122°C

Mass spectrum (ESI⁺): m/z = 586, 588 [M+H]⁺

(38) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(5,5-dimethyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

R_f value: 0.39 (silica gel, ethyl acetate)

Mass spectrum (ESI⁺): m/z = 554, 556 [M+H]⁺

(39) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(5-methyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

R_f value: 0.15 (silica gel, ethyl acetate/cyclohexane = 4:1)

Mass spectrum (ESI⁺): m/z = 540, 542 [M+H]⁺

(40) (R)-4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

Melting point: 133°C

Mass spectrum (ESI⁺): m/z = 554, 556 [M+H]⁺

- 117 -

(41) *cis*-4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[2,5-bis-(ethoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

Melting point: 117-120°C

Mass spectrum (ESI⁺): m/z = 640, 642 [M+H]⁺

(42) *cis*-4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[2,6-bis-(methoxycarbonyl)-piperidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

R_f value: 0.20 (silica gel, cyclohexane/ethyl acetate = 2:3)

Mass spectrum (EI): m/z = 625, 627 [M]⁺

(43) *trans*-4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[2,6-bis-(methoxycarbonyl)-piperidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

R_f value: 0.28 (silica gel, cyclohexane/ethyl acetate = 2:3)

Mass spectrum (EI): m/z = 625, 627 [M]⁺

(44) *cis*-4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[2,5-bis-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

Melting point: 125°C

Mass spectrum (ESI⁻): m/z = 610, 612 [M-H]⁻

(45) *trans*-4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[2,5-bis-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

Melting point: 165°C

Mass spectrum (EI): m/z = 611, 613 [M]⁺

(46) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-4-methyl-1-oxo-2-buten-1-yl)-amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.45 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 609, 611 [M-H]⁻

(47) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{4-[1,2-bis-(methoxycarbonyl)-ethyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)-amino]-7-cyclobutyloxy-quinazoline (The starting material 2-(piperazin-1-yl)-succinic acid dimethyl ester is prepared by reaction of N-benzyl-piperazine with maleic acid dimethyl ester followed by hydrogenolytic cleavage of the benzyl protecting group.)

R_f value: 0.39 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (EI): m/z = 654, 656 [M]⁺

(48) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{N-[1-(methoxycarbonyl)-ethyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.41 (silica gel, ethyl acetate)

Mass spectrum (ESI⁻): m/z = 540, 542 [M-H]⁻

(49) (S)-4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[2-(benzyl-oxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

R_f value: 0.20 (silica gel, cyclohexane/ethyl acetate = 2:3)

Mass spectrum (ESI⁻): m/z = 628, 630 [M-H]⁻

(50) 4-[(R)-(1-Phenyl-ethyl)amino]-6-[(4-{4-[(ethoxycarbonyl)-methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclobutyloxy-quinazoline

R_f value: 0.25 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (EI): m/z = 572 [M]⁺

(51) 4-[(R)-(1-Phenyl-ethyl)amino]-6-[(4-{4-[(ethoxycarbonyl)-methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopentyloxy-quinazoline

R_f value: 0.27 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 585 [M-H]⁻

(52) 4-[(R)-(1-Phenyl-ethyl)amino]-6-[(4-{4-[(ethoxycarbonyl)-methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.20 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 571 [M-H]⁻

(53) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{2-[(ethoxycarbonyl)methyl]-piperidin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.28 (silica gel, ethyl acetate)

Mass spectrum (ESI⁻): m/z = 594, 596 [M-H]⁻

(54) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[1-(ethoxycarbonyl)-ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.56 (silica gel, ethyl acetate)

Mass spectrum (EI): m/z = 627, 629 [M]⁺

(55) (S)-4-Benzylamino-6-[(4-{2-(methoxycarbonyl)-pyrrolidin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.48 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 514 [M-H]⁻

(56) 4-Benzylamino-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.20 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 557 [M-H]⁻

(57) (R)-4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{N-[1-(ethoxycarbonyl)-ethyl]-N-(2-hydroxyethyl)amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.24 (silica gel, ethyl acetate)

Mass spectrum (ESI⁻): m/z = 584, 586 [M-H]⁻

- 120 -

(58) 4-[(3-Chloro-4-fluoro-phenyl) amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-homopiperazin-1-yl}-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline (The starting material N-[(ethoxycarbonyl)methyl]-homopiperazine was prepared by reaction of N-benzyl-homopiperazine with ethyl bromo-acetate and subsequent hydrogenolytic removal of the benzyl group.)

R_f value: 0.18 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 609, 611 [M-H]⁻

(59) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-[N-(2-oxo-tetrahydrofuran-3-yl)-N-methyl-amino]-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(The starting material 3-methylamino-2-oxo-tetrahydrofuran is prepared by reaction of 3-bromo-2-oxo-tetrahydrofuran with N-methyl-benzylamin followed by hydrogenolytic cleavage of the benzyl group)

melting point: 109°C

Mass spectrum (ESI⁻): m/z = 538, 540 (M-H)⁻

(60) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-[N-(2-oxo-tetrahydrofuran-4-yl)-N-methyl-amino]-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(The starting material 4-methylamino-2-oxo-tetrahydrofuran is prepared by reaction of (5H)-furan-2-on with N-methyl-benzylamin followed by hydrogenolytic cleavage of the benzyl group)

R_f-value: 0.56 (silica gel, ethylacetate/methanol = 9:1)

Mass spectrum (ESI⁻): m/z = 538, 540 (M-H)⁻

Example 6

4-[(3-Bromophenyl) amino]-7-{3-[4-(carboxymethyl)-piperazin-1-yl]propyloxy}-6-[(vinylcarbonyl) amino]-quinazoline

0.43 ml of triethylamine and 0.15 ml of chlorotrimethylsilane are added to a suspension of 440 mg of 6-amino-4-[(3-bromophenyl) amino]-7-{3-[4-(carboxymethyl)-piperazin-1-yl]propyloxy}-quinazoline in 15 ml of methylene chloride at ambient temperature. The reaction mixture is refluxed gently for about 30

- 121 -

minutes and then stirred overnight at ambient temperature. The cloudy solution is cooled with a mixture of ice and sodium chloride and combined with a solution of 82 mg of acrylic acid chloride in 5 ml of methylene chloride. The reaction mixture is stirred for about one hour at ambient temperature, then at intervals of an hour two drops of acrylic acid chloride are added twice until the reaction is almost complete. The reaction mixture is stirred with 20 ml of ice water and a little methanol. The aqueous phase is extracted several times with methylene chloride/methanol (9:1). The combined extracts are washed with a little water, dried over magnesium sulphate and concentrated by evaporation. The crude product obtained is stirred with acetone, suction filtered, washed again with diethylether and dried at 60°C in vacuo.

Yield: 105 mg (24 % of theory)

Melting point: 140°C (decomposition)

Mass spectrum (ESI⁺): m/z = 567, 569 [M-H]⁺

Example 7

4-[(3-bromophenyl)amino]-6-{[4-(2,6-diethoxy-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

1 ml of ice-cooled concentrated hydrochloric acid is added to 340 mg of 4-[(3-bromophenyl)amino]-6-({4-[N,N-bis(2,2-diethoxyethyl)amino]-1-oxo-2-buten-1-yl}amino)-7-methoxy-quinazoline while cooling with an ice bath. The mixture is left to stand for 3 hours before 1.5 ml of concentrated ammonia solution is added dropwise while cooling with an ice bath for working up. The precipitate formed is suction filtered and washed with water. The crude product is purified by chromatography on a silica gel column with methylene chloride/methanol (20:1).

Yield: 50 mg (17 % of theory)

Melting point: 133-138°C

Mass spectrum (EI): m/z = 585, 587 [M]⁺

Example 8

4-[(3-Bromophenyl)amino]-6-[(4-{N-[(tert-butyloxycarbonyl)methyl]-N-[2-(acetylsulphanyl)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

34 mg of potassium thioacetate are added to 150 mg of 4-[(3-bromophenyl)amino]-6-[(4-{N-[(tert-butyloxycarbonyl)methyl]-N-[2-(methylsulphonyloxy)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline in 1 ml of dimethylformamide at ambient temperature. The reaction mixture is stirred overnight at ambient temperature and then combined with water for working up. The aqueous phase is separated off and extracted with ethyl acetate, the combined organic phases are dried over magnesium sulphate and freed from solvent in the rotary evaporator.

Yield: 20 mg (14 % of theory),

R_f value: 0.62 (silica gel, ethyl acetate/methanol = 15:1)

Mass spectrum (EI): m/z = 643, 645 [M]⁺

The following compound is obtained analogously to Example 8:

(1) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[2-(acetylsulphanyl)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.64 (silica gel, ethyl acetate)

Mass spectrum (EI): m/z = 629, 631 [M]⁺

Example 9

4-[(3-bromophenyl)amino]-6-[(4-{N-(carboxymethyl)-N-(2-hydroxyethyl)amino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

1 ml of trifluoroacetic acid is added dropwise within two minutes to a solution of 330 mg of 4-[(3-bromophenyl)amino]-6-[(4-{N-[(tert-butyloxycarbonyl)methyl]-N-(2-hydroxyethyl)amino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline in 4 ml of methylene chloride while cooling with an ice bath. The reaction mixture is stirred for half an hour while cooling with an

- 123 -

ice bath and then for a further 24 hours at ambient temperature. For working up, the mixture is evaporated to dryness in the rotary evaporator. The crude product is stirred with ethyl acetate, the solid precipitate is filtered off, washed with ethyl acetate and dried in vacuo at 50°C.

Yield: 169 mg (57 % of theory),

R_f value: 0.50 (Reversed phase ready-made TLC plate (E. Merck), acetonitrile/water/trifluoroacetic acid = 50:50:1)

Mass spectrum (ESI⁻): m/z = 528, 530 [M-H]⁻

The following compounds are obtained analogously to Example 9:

(1) 4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[4-(carboxymethyl)-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

R_f value: 0.43 (Reversed phase ready-made TLC plate (E. Merck), acetonitrile/water/trifluoroacetic acid = 1:1:1)

Mass spectrum (ESI⁻): m/z = 567, 569 [M-H]⁻

(2) 4-[(3-bromophenyl)amino]-6-[(4-{4-[(phosphono)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-quinazoline (The substance is obtained by treating the compound obtained in Example 5(21) with trimethylbromosilane in dimethylformamide)

R_f value: 0.58 (Reversed phase ready-made TLC plate (E. Merck), acetonitrile/water/trifluoroacetic acid = 1:1:1)

Mass spectrum (ESI⁻): m/z = 559, 561 [M-H]⁻

Example 10

4-[(3-chloro-4-fluorophenyl)amino]-6-({4-(2,2-dimethyl-6-oxomorpholin-4-yl)-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

15 mg of p-toluenesulphonic acid monohydrate are added to 150 mg of 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-(2-hydroxy-2-methyl-propyl)amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline in 2.5 ml of acetonitrile. The solution formed is stirred first for

- 124 -

three hours at ambient temperature, then refluxed for a further two hours until the reaction is complete. For working up, the reaction mixture is combined with 30 ml of ethyl acetate. The organic phase is separated off, washed with saturated sodium hydrogen carbonate solution and saturated sodium chloride solution, dried over magnesium sulphate and concentrated by evaporation. The oily yellow residue is stirred with diethyl-ether, whereupon a light yellow solid crystallises out, which is filtered off and dried.

Yield: 85 mg (61 % of theory),

Melting point: 140-142°C

Mass spectrum (ESI⁺): m/z = 554, 556 [M+H]⁺

The following compound is obtained analogously to Example 10:

(1) (R)-4-[(3-Chloro-4-fluoro-phenyl)amino]-6-{[4-(3-methyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropyl-methoxy-quinazoline

Melting point: 192°C

Mass spectrum (ESI⁻): m/z = 538, 540 [M-H]⁻

Example 11

4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-[2-(methylcarbonyloxy)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

47 µl of acetic anhydride and catalytic amounts of 4-dimethyl-aminopyridine are added to 250 mg of 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-(2-hydroxy-ethyl)amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline in 2 ml of methylene chloride. The reaction mixture is stirred overnight at ambient temperature and then evaporated to dryness. The crude product is purified by chromatography on a silica gel column with methylene chloride, followed by methylene chloride/methanol (9:1) as eluant.

Yield: 150 mg (56 % of theory),

Melting point: 90-92°C

Mass spectrum (ESI⁺): m/z = 614, 616 [M+H]⁺

Example 12

4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{4-[(benzyloxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

500 mg of 4-[(3-chloro-4-fluoro-phenyl)amino]-6-{[4-(piperazin-1-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline are dissolved in 5 ml of acetonitrile, and 0.35 ml of triethylamine followed by 0.17 ml of benzyl bromo-acetate are added dropwise at room temperature. The reaction mixture is stirred for approximately 45 minutes at room temperature and then concentrated in vacuo. The solid residue is triturated with water and filtered off. The crude product is purified by column chromatography on silica gel with methylene chloride/methanol (20:1) followed by recrystallization from ethyl acetate.

Yield: 380 mg (59 % of theory),

Melting point: 174°C

Mass spectrum (ESI⁺): m/z = 657, 659 [M-H]⁺

The following compounds are obtained analogously to Example 12:

(1) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{4-[(phenyloxy-carbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.50 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 645, 647 [M+H]⁺

(2) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{4-[(indan-5-yl-oxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline (reaction is carried out in N,N-dimethyl-formamide)

R_f value: 0.52 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 685, 687 [M+H]⁺

(3) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{4-[(cyclohexyl-methoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)-amino]-7-cyclopropylmethoxy-quinazoline (reaction is carried out in tetrahydrofuran)

R_f value: 0.52 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 665, 667 [M+H]⁺

(4) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{4-[(octyloxy-carbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline (reaction is carried out in tetrahydrofuran)

R_f value: 0.50 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 681, 683 [M+H]⁺

(5) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{4-[(hexyloxy-carbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

R_f value: 0.52 (silica gel, methylene chloride/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 653, 655 [M+H]⁺

(6) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{2-(ethoxycarbonyl)-4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline (reaction is carried out in tetrahydrofuran)

R_f value: 0.60 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (EI): m/z = 668, 670 [M]⁺

(7) 4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{4-[3-(ethoxycarbonyl)-propyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline (reaction is carried out with ethyl 4-bromobutyrate in tetrahydrofuran)

R_f value: 0.42 (silica gel, methylene chloride/methanol/concentrated aqueous ammonia = 90:10:1)

Mass spectrum (ESI⁻): m/z = 623, 625 [M-H]⁻

Example 13

4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[2-(ethoxycarbonyl)-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropyl-methoxy-quinazoline

5 ml of trifluoro-acetic acid are added dropwise to a mixture of 4.00 g 4-[(3-chloro-4-fluoro-phenyl)amino]-6-({4-[2-(ethoxycarbonyl)-4-(tert-butyloxycarbonyl)-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline in 15 ml of methylene chloride cooled to 0°C in an ice/water bath. The resulting mixture is stirred for one hour at 0°C and then allowed to warm to room temperature over night. The solvent is distilled off in vacuo and the residue is partitioned between 150 ml of methylene chloride/methanol (9:1) and 100 ml of 1N aqueous sodium hydroxide. The aqueous layer is extracted with methylene chloride/methanol (9:1), the combined organic extracts are dried over magnesium sulfate, and concentrated in vacuo to give the title compound.

Yield: 3.08 g (90 % of theory),

R_f value: 0.40 (reversed phase TLC-plate (E. Merck), acetonitrile/water/trifluoro-acetic acid = 50:50:1)

Mass spectrum (ESI⁺): m/z = 583, 585 [M+H]⁺

Example 14

4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[2-(ethoxycarbonyl)-4-methyl-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

A mixture of 500 mg 4-[(3-chloro-4-fluoro-phenyl)amino]-6-({4-[2-(ethoxycarbonyl)-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline, 50 µl glacial acetic acid, and 80 µl of an aqueous formaldehyde solution (37 weight %) in 5 ml methanol is treated with 270 mg sodium triacetoxyborohydride at room temperature. After 6 hours, insoluble salts are removed by filtration and the filtrate is concentrated in vacuo. The residue is made alkaline with 0.1N

- 128 -

aqueous sodium hydroxide solution and extracted with ethyl acetate. The combined extracts are dried over magnesium sulfate and concentrated *in vacuo*. The crude product is purified by column chromatography on silica gel with ethyl acetate/methanol (90:10 to 85:15).

Yield: 350 mg (68 % of theory),

R_f : 0.27 (silica gel, ethyl acetate/methanol = 9:1)

Mass spectrum (ESI⁺): m/z = 597, 597 [M+H]⁺

Example 15

4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[2-(ethoxycarbonyl)-4-(methylsulfonyl)-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

A stirred mixture of 500 mg 4-[(3-chloro-4-fluoro-phenyl)amino]-6-({4-[2-(ethoxycarbonyl)-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline and 0.20 ml triethylamine in 5 ml of methylene chloride is cooled in an ice/water bath, and 80 μ l of methanesulfonyl chloride are added dropwise. The reaction mixture is stirred for one hour at 0°C and another two hours at room temperature. Aqueous work-up followed by column chromatography on silica gel with methylene chloride/methanol (97:2) gives the title compound as a slightly yellow solid.

Yield: 395 mg (70 % of theory),

Melting point: 170-173°C

Mass spectrum (ESI⁺): m/z = 661, 663 [M+H]⁺

Example 16

4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4-{4-[2-(ethoxycarbonyl)-ethyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

A mixture of 200 mg of 4-[(3-chloro-4-fluoro-phenyl)amino]-6-({4-(piperazin-1-yl)-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline and 0.11 ml of ethyl acrylate in 2 ml of ethanol is heated under reflux for one hour. The sol-

- 129 -

vent is evaporated *in vacuo* and the crude product is purified by column chromatography on silica gel with methylene chloride/methanol (95:5 to 90:10) followed by recrystallization from diethyl ether.

Yield: 164 mg (69 % of theory),

Melting point: 183-185°C

Mass spectrum (ESI⁻): m/z = 609, 611 [M-H]⁻

Example 17

4-[(3-Chloro-4-fluoro-phenyl)amino]-6-[(4,4-dimethyl-4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)aminol]-7-cyclopropylmethoxy-quinazoline

A mixture of 150 mg 4-[(3-chloro-4-fluoro-phenyl)amino]-6-{[2-(diethoxyphosphoryl)-1-oxo-ethyl]amino}-7-cyclopropylmethoxy-quinazoline and 12 mg dry lithium chloride in 2 ml of anhydrous tetrahydrofuran is stirred for 15 minutes at room temperature under an argon atmosphere. The mixture is cooled to 0°C and 43 µl of 1,8-diazabicyclo[5.4.0]undec-7-ene are added. After 30 minutes at 0°C, 84 mg of [4-(1,1-dimethyl-2-oxo-ethyl)-piperazin-1-yl]-acetic acid ethyl ester are added and the resulting mixture is allowed to warm to room temperature over night. The reaction mixture is diluted with ethyl acetate/methanol (15:1) and washed with water. The organic layer is directly submitted to column chromatography on silica gel with ethyl acetate/methanol (95:5 to 90:10).

Yield: 36 mg (21 % of theory),

Melting point: 165-167°C

Mass spectrum (ESI⁺): m/z = 625, 627 [M+H]⁺

Example 18

4-[(3-Chloro-4-fluoro-phenyl)amino]-6-({4-[2-(ethoxycarbonyl)-4-(methylcarbonyl)-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline

0.12 ml of acetic acid anhydride are added dropwise to a mixture of 500 mg of 4-[(3-chloro-4-fluoro-phenyl)amino]-

- 130 -

6-({4-[2-(ethoxycarbonyl)-piperazin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline and 0.18 ml of triethylamine in 5 ml of methylene chloride at 0°C. The reaction mixture is stirred for one hour at 0°C followed by one hour at room temperature, washed with water, concentrated sodium chloride solution, dried over magnesium sulfate, and concentrated *in vacuo*. The crude product is purified by column chromatography on silica gel with ethyl acetate/methanol (98:2 to 95:5).

Yield: 291 mg (54 % of theory),

Melting point: 152-156°C

Mass spectrum (ESI⁺): m/z = 625, 627 [M+H]⁺

The following compounds may also be obtained analogously to the preceding Examples and other methods known from the literature:

(1) 4-[(3-bromophenyl)amino]-7-(3-{4-[(butyloxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(2) 4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(3) 4-[(3-bromophenyl)amino]-7-(2-{N-[(ethoxycarbonyl)methyl]-N-methylamino}ethoxy)-6-[(vinylcarbonyl)amino]-quinazoline

(4) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(5) 4-[(3-bromophenyl)amino]-7-(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}butyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(6) 4-[(3-bromophenyl)amino]-7-{3-[4-(carboxymethyl)-piperazin-1-yl]propyloxy}-6-[(vinylcarbonyl)amino]-quinazoline

- 131 -

(7) 4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)methyl]-piperazin-1-yl}propyloxy)-6-[(1-oxo-2-buten-1-yl)amino]-quinazoline

(8) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(methoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(9) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(propyloxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(10) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(isobutyloxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(11) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(cyclohexyloxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(12) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(hexyloxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(13) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(cyclopropylmethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(14) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(cyclohexylmethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(15) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(benzyloxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

- 132 -

(16) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-ethylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(17) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-butylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(18) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-cyclopropylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(19) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-(cyclopropylmethyl)amino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(20) 4-[(3-bromophenyl)amino]-6-[(4-{N-[2-(ethoxycarbonyl)-ethyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(21) 4-[(3-bromophenyl)amino]-6-[(4-{N-[3-(ethoxycarbonyl)-propyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(22) 4-[(3-bromophenyl)amino]-6-[(4-{N-[1-(ethoxycarbonyl)-ethyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(23) 4-[(3-bromophenyl)amino]-6-[(4-[2-(ethoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(24) 4-[(3-bromophenyl)amino]-6-[(4-[4-(ethoxycarbonyl)-piperidin-1-yl]-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(25) 4-[(3-bromophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)-methyl]-piperidin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

- 133 -

(26) 4-[(3-bromophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(27) 4-[(3-bromophenyl)amino]-6-[(6-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-hexen-1-yl)amino]-7-methoxy-quinazoline

(28) 4-[(3-bromophenyl)amino]-6-[(3-{1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}-1-oxo-2-propen-1-yl)amino]-7-methoxy-quinazoline

(29) 4-[(3-bromophenyl)amino]-6-[(4-{3-(ethoxycarbonyl)-4-methyl-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(30) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(diethoxyphosphoryl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(31) 4-[(3-bromophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-butyn-1-yl)amino]-7-methoxy-quinazoline

(32) 4-[(3-bromophenyl)amino]-6-[(4-{N-[2-(ethoxycarbonyl)ethyl]-N-methylamino}-1-oxo-2-butyn-1-yl)amino]-7-methoxy-quinazoline

(33) 4-[(3-bromophenyl)amino]-6-[(4-{N-[3-(ethoxycarbonyl)-propyl]-N-methylamino}-1-oxo-2-butyn-1-yl)amino]-7-methoxy-quinazoline

(34) 4-[(3-bromophenyl)amino]-6-[(4-{2-{N-[(ethoxycarbonyl)methyl]-N-methylamino}ethylamino)-1,4-dioxo-2-buten-1-yl}amino]-7-methoxy-quinazoline

- 134 -

(35) 4-[(3-bromophenyl)amino]-6-{[4-(2-{N-[2-(ethoxycarbonyl)-ethyl]-N-methylamino}ethylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

(36) 4-[(3-bromophenyl)amino]-6-{[4-(3-{N-[(ethoxycarbonyl)-methyl]-N-methylamino}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

(37) 4-[(3-bromophenyl)amino]-6-{[4-(3-{N-[(methoxycarbonyl)-methyl]-N-methylamino}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

(38) 4-[(3-bromophenyl)amino]-6-{[4-(3-{N-[(butyloxycarbonyl)-methyl]-N-methylamino}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

(39) 4-[(3-bromophenyl)amino]-6-{[4-(3-{N-[(cyclohexyloxycarbonyl)-methyl]-N-methylamino}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

(40) 4-[(3-bromophenyl)amino]-6-[(4-{3-[2-(ethoxycarbonyl)-pyrrolidin-1-yl]propylamino}-1,4-dioxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(41) 4-[(3-bromophenyl)amino]-6-[(4-{3-[2-(methoxycarbonyl)-piperidin-1-yl]propylamino}-1,4-dioxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(42) 4-[(3-bromophenyl)amino]-6-[(4-{3-[4-(ethoxycarbonyl)-piperidin-1-yl]propylamino}-1,4-dioxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(43) 4-[(3-bromophenyl)amino]-6-[(4-{3-[3-(ethoxycarbonyl)-piperidin-1-yl]propylamino}-1,4-dioxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

- 135 -

(44) 4-[(3-bromophenyl)amino]-6-{[4-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

(45) 4-[(3-bromophenyl)amino]-6-{[4-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-quinazoline

(46) 4-[(3-bromophenyl)amino]-6-{[4-(3-[2-(ethoxycarbonyl)-pyrrolidin-1-yl]propylamino)-1,4-dioxo-2-buten-1-yl]amino}-quinazoline

(47) 4-[(3-bromophenyl)amino]-6-{[4-(N-{1-[(ethoxycarbonyl)methyl]-2-(ethoxycarbonyl)-ethyl}-N-methylamino)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

(48) 4-[(3-bromophenyl)amino]-6-{[4-(N-[1,2-bis(ethoxycarbonyl)-ethyl]-N-methylamino)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

(49) 4-[(3-bromophenyl)amino]-6-{[4-(N-{[(ethoxy)(methyl)-phosphoryl]methyl}-N-methylamino)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

(50) 4-[(3-bromophenyl)amino]-7-(3-{N-[(isobutyloxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(51) 4-[(3-bromophenyl)amino]-7-(3-{N-[(cyclopentyloxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(52) 4-[(3-bromophenyl)amino]-7-{3-[2-(ethoxycarbonyl)-pyrrolidin-1-yl]propyloxy}-6-[(vinylcarbonyl)amino]-quinazoline

(53) 4-[(3-bromophenyl)amino]-7-{3-[2-(ethoxycarbonyl)-piperidin-1-yl]propyloxy}-6-[(vinylcarbonyl)amino]-quinazoline

- 136 -

(54) 4-[(3-bromophenyl)amino]-7-(3-{N-[1-(ethoxycarbonyl)-ethyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(55) 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(1-oxo-2-buten-1-yl)amino]-quinazoline

(56) 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(1-oxo-2,4-hexadien-1-yl)amino]-quinazoline

(57) 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(3-phenyl-1-oxo-2-propen-1-yl)amino]-quinazoline

(58) 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(1-oxo-2-buten-1-yl)amino]-quinazoline

(59) 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(1-oxo-4,4,4-trifluor-2-buten-1-yl)amino]-quinazoline

(60) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(1-oxo-4,4,4-trifluor-2-buten-1-yl)amino]-quinazoline

(61) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-[(1-oxo-2-buten-1-yl)amino]-quinazoline

(62) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-[(1-oxo-2-buten-1-yl)amino]-quinazoline

(63) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-[(1-oxo-2,4-hexadien-1-yl)amino]-quinazoline

(64) 4-[(3-bromophenyl)amino]-6-{[2-({N-[(ethoxycarbonyl)methyl]-N-methylamino}methyl)-1-oxo-2-propen-1-yl]amino}-7-methoxy-quinazoline

(65) 4-[(3-bromophenyl)amino]-6-{[2-({N-[(ethoxycarbonyl)methyl]-N-methylamino}methyl)-1-oxo-2-propen-1-yl]amino}-quinazoline

(66) 4-[(3-chlorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(67) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(68) 4-[(3-methylphenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(69) 4-[(3-trifluoromethylphenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(70) 4-[(3-ethynylphenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(71) 4-[(3-cyanophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

- 138 -

(72) 4-[(3-methoxyphenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(73) 4-[(3,4-difluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(74) 4-[(3-bromo-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline

(75) 4-[(3-chlorophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(76) 4-[(3-chloro-4-fluorophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(77) 4-[(3-bromo-4-fluorophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(78) 4-[(3,4-difluorophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(79) 4-[(3-cyanophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(80) 4-[(3-methoxyphenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

- 139 -

(81) 4-[(3-methylphenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(82) 4-[(3-trifluoromethylphenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(83) 4-[(3-ethynylphenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline

(84) 4-[(3-bromophenyl)amino]-3-cyano-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinoline

(85) 4-[(3-bromophenyl)amino]-3-cyano-7-(2-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}ethoxy)-6-[(vinylcarbonyl)amino]-quinoline

(86) 4-[(3-bromophenyl)amino]-3-cyano-7-(3-{1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinoline

(87) 4-[(3-bromophenyl)amino]-3-cyano-7-(2-{1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}ethoxy)-6-[(vinylcarbonyl)amino]-quinoline

(88) 4-[(3-bromophenyl)amino]-3-cyano-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}methoxy)-6-[(vinylcarbonyl)amino]-quinoline

(89) 4-[(3-bromophenyl)amino]-3-cyano-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinoline

- 140 -

(90) 4-[(3-bromophenyl)amino]-3-cyano-7-(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}butyloxy)-6-[(vinylcarbonyl)amino]-quinoline

(91) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinoline

(92) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinoline

(93) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-ethylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinoline

(94) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N,N-bis[(ethoxycarbonyl)methyl]amino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinoline

(95) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{2-(ethoxycarbonyl)-pyrrolidin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinoline

(96) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperidin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinoline

(97) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N-[(diethoxyphosphoryl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinoline

(98) 4-[(3-bromophenyl)amino]-3-cyano-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-butyne-1-yl)amino]-7-methoxy-quinoline

- 141 -

(99) 4-[(3-bromophenyl)amino]-3-cyano-6-{[2-({N-[(ethoxycarbonyl)methyl]-N-methylamino}methyl)-1-oxo-2-propen-1-yl]amino}-7-methoxy-quinoline

(100) 4-[(3-bromophenyl)amino]-3-cyano-6-{[4-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-methoxy-quinoline

(101) 4-[(3-bromophenyl)amino]-3-cyano-6-{[4-(3-{N,N-bis[(ethoxycarbonyl)methyl]-amino}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-methoxy-quinoline

(102) 4-[(3-bromophenyl)amino]-3-cyano-6-{[4-(3-[2-(ethoxycarbonyl)-pyrrolidin-1-yl]propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-methoxy-quinoline

(103) 4-[(3-bromophenyl)amino]-3-cyano-6-{[4-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-methoxy-quinoline

(104) 4-[(3-bromophenyl)amino]-6-{[4-(2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline

(105) 4-[(3-bromophenyl)amino]-7-[3-(2-oxo-morpholin-4-yl)propyloxy]-6-[(vinylcarbonyl)amino]-quinazoline

(106) 4-[(3-bromophenyl)amino]-7-[3-(2-oxo-morpholin-4-yl)propyloxy]-6-[(1-oxo-2-butyne-1-yl)amino]-quinazoline

(107) 4-[(3-bromophenyl)amino]-7-[4-methyl-2-oxo-morpholin-6-yl)methoxy]-6-[(1-oxo-2-butyne-1-yl)amino]-quinazoline

(108) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

- 142 -

(109) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{N,N-bis[(methoxycarbonyl)methyl] amino}-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(110) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{N-[(diethoxyphosphoryl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(111) 4-[(3-chloro-4-fluorophenyl) amino]-6-({4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl} amino)-7-cyclopropylmethoxy-quinazoline

(112) 4-[(3-chloro-4-fluorophenyl) amino]-6-({4-[2-(methoxycarbonyl)-piperidin-1-yl]-1-oxo-2-buten-1-yl} amino)-7-cyclopropylmethoxy-quinazoline

(113) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(114) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{4-[(diethoxyphosphoryl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(115) 4-[(3-chloro-4-fluorophenyl) amino]-6-({4-[3-(methoxycarbonyl)-morpholin-4-yl]-1-oxo-2-buten-1-yl} amino)-7-cyclopropylmethoxy-quinazoline

(116) 4-[(3-chloro-4-fluorophenyl) amino]-6-{[4-(2-methoxycarbonyl-4-methyl-piperazin-1-yl)-1-oxo-2-buten-1-yl] amino}-7-cyclopropylmethoxy-quinazoline

(117) 4-[(3-chloro-4-fluorophenyl) amino]-6-{[4-(2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl] amino}-7-cyclopropylmethoxy-quinazoline

- 143 -

(118) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(3-methyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

(119) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(6-methyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

(120) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(6,6-dimethyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

(121) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(2-ethoxy-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

(122) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(2,6-diethoxymorpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

(123) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-[N-(2,2-dimethoxyethyl)-N-methylamino]-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

(124) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-[N-(1,3-dioxolan-2-ylmethyl)-N-methylamino]-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

(125) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-[N-(2-oxo-tetrahydrofuran-3-yl)-N-methylamino]-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

(126) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-[N-(2-oxo-tetrahydrofuran-4-yl)-N-methylamino]-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline

- 144 -

(127) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[2-(acetyl-sulphanyl)ethyl] amino}-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(128) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[2-(isobutylcarbonylsulphanyl)ethyl] amino}-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(129) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-butyne-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(130) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{N,N-bis[(methoxycarbonyl)methyl] amino}-1-oxo-2-butyne-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(131) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-butyne-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(132) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-butyne-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(133) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{4-[bis(methoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(134) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{4-[1,2-bis(methoxycarbonyl)ethyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

(135) 4-[(3-chloro-4-fluorophenyl) amino]-6-[(4-{4-[1-[(methoxycarbonyl)methyl]-2-(methoxycarbonyl)-ethyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl) amino]-7-cyclopropylmethoxy-quinazoline

- 145 -

(136) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(3-{N,N-bis-[(methoxycarbonyl)methyl]amino}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

(137) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(3-{N-[(methoxycarbonyl)methyl]-N-methylamino}propylamino)-1,4-dioxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

Example 19

Coated tablets containing 75 mg of active substance

1 tablet core contains:

active substance	75.0 mg
calcium phosphate	93.0 mg
corn starch	35.5 mg
polyvinylpyrrolidone	10.0 mg
hydroxypropylmethylcellulose	15.0 mg
magnesium stearate	<u>1.5 mg</u>
	230.0 mg

Preparation:

The active substance is mixed with calcium phosphate, corn starch, polyvinylpyrrolidone, hydroxypropylmethylcellulose and half the specified amount of magnesium stearate. Blanks 13 mm in diameter are produced in a tablet-making machine and these are then rubbed through a screen with a mesh size of 1.5 mm using a suitable machine and mixed with the rest of the magnesium stearate. This granulate is compressed in a tablet-making machine to form tablets of the desired shape.

Weight of core: 230 mg

die: 9 mm, convex

The tablet cores thus produced are coated with a film consisting essentially of hydroxypropylmethylcellulose. The finished film-coated tablets are polished with beeswax.

Weight of coated tablet: 245 mg.

- 146 -

Example 20Tablets containing 100 mg of active substance

Composition:

1 tablet contains:

active substance	100.0 mg
lactose	80.0 mg
corn starch	34.0 mg
polyvinylpyrrolidone	4.0 mg
magnesium stearate	<u>2.0 mg</u>
	220.0 mg

Method of Preparation:

The active substance, lactose and starch are mixed together and uniformly moistened with an aqueous solution of the polyvinylpyrrolidone. After the moist composition has been screened (2.0 mm mesh size) and dried in a rack-type drier at 50°C it is screened again (1.5 mm mesh size) and the lubricant is added. The finished mixture is compressed to form tablets.

Weight of tablet: 220 mg

Diameter: 10 mm, biplanar, facettted on both sides and notched on one side.

Example 21Tablets containing 150 mg of active substance

Composition:

1 tablet contains:

active substance	150.0 mg
powdered lactose	89.0 mg
corn starch	40.0 mg
colloidal silica	10.0 mg
polyvinylpyrrolidone	10.0 mg
magnesium stearate	<u>1.0 mg</u>
	300.0 mg

- 147 -

Preparation:

The active substance mixed with lactose, corn starch and silica is moistened with a 20% aqueous polyvinylpyrrolidone solution and passed through a screen with a mesh size of 1.5 mm. The granules, dried at 45°C, are passed through the same screen again and mixed with the specified amount of magnesium stearate. Tablets are pressed from the mixture.

Weight of tablet: 300 mg

die: 10 mm, flat

Example 22Hard gelatine capsules containing 150 mg of active substance

1 capsule contains:

active substance		150.0 mg
corn starch (dried)	approx.	180.0 mg
lactose (powdered)	approx.	87.0 mg
magnesium stearate		<u>3.0 mg</u>
	approx.	420.0 mg

Preparation:

The active substance is mixed with the excipients, passed through a screen with a mesh size of 0.75 mm and homogeneously mixed using a suitable apparatus. The finished mixture is packed into size 1 hard gelatine capsules.

Capsule filling: approx. 320 mg

Capsule shell: size 1 hard gelatine capsule.

Example 23Suppositories containing 150 mg of active substance

1 suppository contains:

active substance	150.0 mg
polyethyleneglycol 1500	550.0 mg

- 148 -

polyethyleneglycol 6000	460.0 mg
polyoxyethylene sorbitan monostearate	<u>840.0 mg</u>
	2,000.0 mg

Preparation:

After the suppository mass has been melted the active substance is homogeneously distributed therein and the melt is poured into chilled moulds.

Example 24Suspension containing 50 mg of active substance

100 ml of suspension contain:

active substance	1.00 g
carboxymethylcellulose-Na-salt	0.10 g
methyl p-hydroxybenzoate	0.05 g
propyl p-hydroxybenzoate	0.01 g
glucose	10.00 g
glycerol	5.00 g
70% sorbitol solution	20.00 g
flavouring	0.30 g
dist. water	ad 100 ml

Preparation:

The distilled water is heated to 70°C. The methyl and propyl p-hydroxybenzoates together with the glycerol and sodium salt of carboxymethylcellulose are dissolved therein with stirring. The solution is cooled to ambient temperature and the active substance is added and homogeneously dispersed therein with stirring. After the sugar, the sorbitol solution and the flavouring have been added and dissolved, the suspension is evacuated with stirring to eliminate air.

5 ml of suspension contain 50 mg of active substance.

- 149 -

Example 25Ampoules containing 10 mg active substance

Composition:

active substance		10.0 mg
0.01 N hydrochloric acid q.s.		
double-distilled water	ad	2.0 ml

Preparation:

The active substance is dissolved in the necessary amount of 0.01 N HCl, made isotonic with common salt, filtered sterile and transferred into 2 ml ampoules.

Example 26Ampoules containing 50 mg of active substance

Composition:

active substance		50.0 mg
0.01 N hydrochloric acid q.s.		
double-distilled water	ad	10.0 ml

Preparation:

The active substance is dissolved in the necessary amount of 0.01 N HCl, made isotonic with common salt, filtered sterile and transferred into 10 ml ampoules.

Example 27Capsules for powder inhalation containing 5 mg of active substance

1 capsule contains:

active substance	5.0 mg
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- 150 -

lactose for inhalation

15.0 mg

20.0 mg

Preparation:

The active substance is mixed with lactose for inhalation. The mixture is packed into capsules in a capsule-making machine (weight of the empty capsule approx. 50 mg).

weight of capsule: 70.0 mg

size of capsule = 3

Example 28**Solution for inhalation for hand-held nebulisers containing 2.5 mg active substance**

1 spray contains:

active substance	2.500 mg
benzalkonium chloride	0.001 mg
1N hydrochloric acid q.s.	
ethanol/water (50/50)	ad 15.000 mg

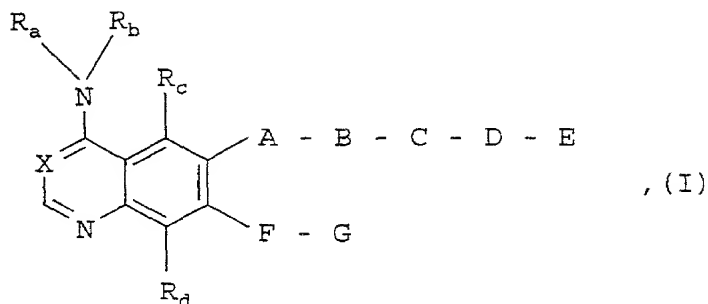
Preparation:

The active substance and benzalkonium chloride are dissolved in ethanol/water (50/50). The pH of the solution is adjusted with 1N hydrochloric acid. The resulting solution is filtered and transferred into suitable containers for use in hand-held nebulisers (cartridges).

Contents of the container: 4.5 g

Patent Claims

1. Bicyclic heterocycles of general formula



wherein

R_a denotes a hydrogen atom or a C_{1-4} -alkyl group,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , whilst

R_1 and R_2 , which may be identical or different, in each case denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a C_{1-4} -alkyl, hydroxy, C_{1-4} -alkoxy, C_{3-6} -cycloalkyl, C_{4-6} -cycloalkoxy, C_{2-5} -alkenyl or C_{2-5} -alkynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a C_{3-5} -alkenyloxy or C_{3-5} -alkynyloxy group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C_{1-4} -alkylsulphenyl, C_{1-4} -alkylsulphinyl, C_{1-4} -alkylsulphonyl, C_{1-4} -alkylsulphonyloxy, trifluoromethylsulphenyl, trifluoromethylsulphinyl or trifluoromethylsulphonyl group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms,

an ethyl or ethoxy group substituted by 1 to 5 fluorine atoms,

a cyano or nitro group or an amino group optionally substituted by one or two C_{1-4} -alkyl groups, wherein the substituents may be identical or different, or

R_1 together with R_2 , if they are bound to adjacent carbon atoms, denote a $-CH=CH-CH=CH$, $-CH=CH-NH$ or $-CH=N-NH$ group and

R_3 denotes a hydrogen, fluorine, chlorine or bromine atom,

a C_{1-4} -alkyl, trifluoromethyl or C_{1-4} -alkoxy group,

R_c and R_d , which may be identical or different, in each case denote a hydrogen, fluorine or chlorine atom, a methoxy group, or a methyl group optionally substituted by a methoxy, dimethylamino, diethylamino, pyrrolidino, piperidino or morpholino group,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an oxygen atom or an imino group optionally substituted by a C_{1-4} -alkyl group,

B denotes a carbonyl or sulphonyl group,

C denotes a 1,3-allenylene, 1,1 or 1,2-vinylene group which may be substituted in each case by one or two methyl groups or by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by 1 to 4 methyl groups or by a trifluoromethyl group,

D denotes an alkylene, -CO-alkylene or -SO₂-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms and additionally 1 to 4 hydrogen atoms in the alkylene moiety may be replaced by fluorine atoms, while the linking of the -CO-alkylene and -SO₂-alkylene group to the adjacent group C in each case must take place via the carbonyl or sulphonyl group,

a -CO-O-alkylene, -CO-NR₄-alkylene or -SO₂-NR₄-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms, whilst the linking to the adjacent group C in each case must take place via the carbonyl or sulphonyl group, wherein

R₄ denotes a hydrogen atom or a C₁₋₄-alkyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, wherein

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group, which may be substituted by an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉) group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, which may be terminally substituted in each case by a C₁₋₆-alkylcarbonylsulphenyl, C₃₋₇-cycloalkylcarbonylsulphenyl, C₃₋₇-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₇-cycloalkylcarbonyloxy, C₃₋₇-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, each of which may be terminally substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₃₋₇-cycloalkyl or C₃₋₇-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group, which may be substituted by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom or by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

- 155 -

a C₄₋₇-cycloalkyl group optionally substituted by 1 or 2 methyl groups,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, wherein the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₇-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f)-group, whilst

R_e and R_f, which may be identical or different, each denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₇-cycloalkyl, C₁₋₄-alkoxy or C₅₋₇-cycloalkoxy group,

and R₉ denotes a C₁₋₄-alkyl, aryl or aryl-C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which may be substituted by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆OCO or R₆OCO-C₁₋₄-alkyl groups or by an R₆OCO-group and an R₆OCO-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined and

R₁₀ denotes a hydrogen atom, a C₁₋₄-alkyl, formyl, C₁₋₄-alkylcarbonyl or C₁₋₄-alkylsulphonyl group,

- 156 -

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and additionally at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are additionally substituted in each case at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

- 157 -

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 position in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a

- 158 -

di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group, while R₅ is as hereinbefore defined,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R₅ is as hereinbefore defined,

an R₁₁NR₅ group wherein R₅ is as hereinbefore defined and

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

an amino group or an amino group optionally substituted by 1 or 2 C₁₋₄-alkyl groups wherein the alkyl groups may be identical or different and each alkyl moiety may be substituted from position 2 onward by a hydroxy, C₁₋₄-alkoxy, amino, C₁₋₄-alkylamino or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, or by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a 4- to 7-membered alkyleneimino group optionally substituted by 1 to 4 methyl groups,

a 6- to 7-membered alkyleneimino group optionally substituted by 1 or 2 methyl groups wherein in each case a methylene group in the 4 position is replaced by an oxygen or sulphur atom, by

- 159 -

an imino group substituted by the group R_{10} , by a sulphinyl or sulphonyl group, whilst R_{10} is as hereinbefore defined,

an imidazolyl group optionally substituted by 1 to 3 methyl groups,

a C_{5-7} -cycloalkyl group wherein a methylene group is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , by a sulphinyl or sulphonyl group, wherein R_{10} is as hereinbefore defined,

or D together with E denotes a hydrogen, fluorine or chlorine atom,

a C_{1-4} -alkyl group optionally substituted by 1 to 5 fluorine atoms,

a C_{3-6} -cycloalkyl group,

an aryl, heteroaryl, C_{1-4} -alkylcarbonyl, arylcarbonyl, carboxy, C_{1-4} -alkoxycarbonyl, $R_6CO-O-(R_6CR_7)-O-CO$, $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ -group wherein R_6 to R_9 and R_7 to R_9 are as hereinbefore defined,

an aminocarbonyl, C_{1-4} -alkylaminocarbonyl or di- $(C_{1-4}$ -alkyl)-aminocarbonyl group or

a carbonyl group, which is substituted by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , by a sulphinyl or sulphonyl group, while R_{10} is as hereinbefore defined,

F denotes a C_{1-6} -alkylene group, an $-O-C_{1-6}$ -alkylene group, whilst the alkylene moiety is linked to the group G, or an

- 160 -

oxygen atom, whilst the latter may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 -group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, wherein R_5 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

- 161 -

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

- 162 -

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a hydrogen atom, by a C_{1-4} -alkyl, $R_6O-CO-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, wherein R_6 to R_9 are as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups are each linked to a carbon atom of the group F,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 positions by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 -group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl or tri- $(C_{1-4}$ -alkoxy)-methyl group, wherein R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally

- 163 -

substituted by one or two methyl groups, wherein R_5 is as hereinbefore defined,

a R_hNR_5 -group wherein R_5 is as hereinbefore defined and R_h denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally substituted by one or two methyl groups,

an amino group or an amino group optionally substituted by 1 or 2 C_{1-4} -alkyl groups wherein the alkyl groups may be identical or different and each alkyl moiety may be substituted from position 2 onward by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group,

a 4- to 7-membered alkyleneimino group optionally substituted by 1 to 4 methyl groups,

a 6- to 7-membered alkyleneimino group optionally substituted by 1 or 2 methyl groups wherein in each case a methylene group in the 4 position is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , or by a sulphinyl or sulphonyl group, wherein R_{10} is as hereinbefore defined,

an imidazolyl group optionally substituted by 1 to 3 methyl groups,

a C_{5-7} -cycloalkyl group wherein a methylene group is replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , or by a sulphinyl or sulphonyl group, wherein R_{10} is as hereinbefore defined, or

F and G together denote a hydrogen, fluorine or chlorine atom,

- 164 -

a C₁₋₆-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C₁₋₄-alkoxy group,

a C₁₋₆-alkoxy group which is substituted by an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group, while R₆ to R₉ are as hereinbefore defined,

a C₃₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group, an amino group optionally substituted by 1 or 2 C₁₋₄-alkyl groups,

a 5- to 7-membered alkyleneimino group, wherein in the above-mentioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R₁₀, or by a sulphinyl or sulphonyl group, while R₁₀ is as hereinbefore defined,

with the proviso that at least one of the groups E, G or F together with G contains an R₆O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group or

D together with E contains an R₉CO-O-(R_eCR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino or thiomorpholino group substituted in the 2 position or in the 2 and 6 position by a C₁₋₄-alkoxy group,

a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group or

an optionally substituted 1,3-dioxolan-2-yl, 1,3-dioxan-2-yl, 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl-group or

E contains an optionally substituted 2-oxo-thiomorpholino group or an optionally substituted 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl-group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which may in each case be monosubstituted by R_{12} , mono, di or trisubstituted by R_{13} or monosubstituted by R_{12} and additionally mono or disubstituted by R_{13} , wherein the substituents may be identical or different and

R_{12} denotes a cyano, carboxy, C_{1-4} -alkoxycarbonyl, aminocarbonyl, C_{1-4} -alkylaminocarbonyl, di- $(C_{1-4}$ -alkyl)-aminocarbonyl, C_{1-4} -alkylsulphenyl, C_{1-4} -alkylsulphinyl, C_{1-4} -alkylsulphonyl, hydroxy, C_{1-4} -alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C_{1-4} -alkylamino, di- $(C_{1-4}$ -alkyl)-amino, C_{1-4} -alkylcarbonylamino, N- $(C_{1-4}$ -alkyl)- C_{1-4} -alkylcarbonylamino, C_{1-4} -alkylsulphonylamino, N- $(C_{1-4}$ -alkyl)- C_{1-4} -alkylsulphonylamino, aminosulphonyl, C_{1-4} -alkylaminosulphonyl or di- $(C_{1-4}$ -alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino-group, and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-4} -alkyl, trifluoromethyl or C_{1-4} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-5} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

- 166 -

and moreover by the heteroaryl groups mentioned in the definitions of the abovementioned groups is meant a 5-membered heteroaromatic group which contains an imino group, an oxygen or sulphur atom or an imino group, an oxygen or sulphur atom and one or two nitrogen atoms, or

a 6-membered heteroaromatic group, which contains one, two or three nitrogen atoms,

whilst the abovementioned 5-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups and the abovementioned 6-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups or by a fluorine, chlorine, bromine or iodine atom, or by a tri-fluoromethyl, hydroxy, methoxy or ethoxy group,

the tautomers, the stereoisomers and the salts thereof.

2. Bicyclic heterocycles of general formula I according to claim 1, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , while

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine, bromine or iodine atom,

a methyl, ethyl, hydroxy, methoxy, ethoxy, amino, cyano, vinyl or ethynyl group,

an aryl, aryloxy, arylmethyl or arylmethoxy group,

a methyl or methoxy group substituted by 1 to 3 fluorine atoms or

- 167 -

R_1 together with R_2 , if they are bound to adjacent carbon atoms, denote a $-\text{CH}=\text{CH}-\text{CH}=\text{CH}$, $-\text{CH}=\text{CH}-\text{NH}$ or $-\text{CH}=\text{N}-\text{NH}$ group and

R_3 denotes a hydrogen, fluorine, chlorine or bromine atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group or a nitrogen atom,

A denotes an imino group optionally substituted by a methyl or ethyl group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group which is substituted in each case by one or two methyl groups or may be substituted by a trifluoromethyl group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group optionally substituted by a methyl or trifluoromethyl group,

D denotes an alkylene or $-\text{CO}$ -alkylene group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking of the $-\text{CO}$ -alkylene group to the adjacent group C in each case must take place via the carbonyl group,

a $-\text{CO}-\text{O}$ -alkylene or $-\text{CO}-\text{NR}_4$ -alkylene- group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group wherein

R_4 denotes a hydrogen atom or a methyl or ethyl group,

- 168 -

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while

R_5 denotes a hydrogen atom,

a C_{1-4} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a hydroxy, C_{1-4} -alkoxy, di- $(C_{1-4}$ -alkyl)amino, C_{1-6} -alkylcarbonylsulphenyl, C_{3-6} -cycloalkylcarbonylsulphenyl, C_{3-6} -cycloalkyl- C_{1-3} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl- C_{1-3} -alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C_{1-6} -alkylcarbonyloxy, C_{3-6} -cycloalkylcarbonyloxy, C_{3-6} -cycloalkyl- C_{1-3} -alkylcarbonyloxy, arylcarbonyloxy or aryl- C_{1-3} -alkylcarbonyloxy group,

a C_{3-6} -cycloalkyl or C_{3-6} -cycloalkyl- C_{1-3} -alkyl group,

R_6 , R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom,

- 169 -

a C₁₋₈-alkyl group which may be substituted by a hydroxy, C₁₋₄-alkoxy, or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups, in each case a methylene group in the 4 position may be replaced by an oxygen atom or by an N-(C₁₋₂-alkyl)-imino group,

a C₄₋₆-cycloalkyl group,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, while the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₆-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f) group, wherein

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₆-cycloalkyl, C₁₋₄-alkoxy or C₅₋₆-cycloalkoxy group,

and R_h denotes a C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which is substituted by an R_eO-CO, R_eO-CO-C₁₋₄-alkyl or bis-(R_eO-CO)-C₁₋₄-alkyl group wherein R_e is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_eO-CO or R_eO-CO-C₁₋₄-alkyl groups wherein R_e is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and additionally at a cyclic carbon atom by an R_eO-CO, R_eO-CO-C₁₋₄-alkyl or bis-(R_eO-CO)-C₁₋₄-alkyl group wherein R_e is as hereinbefore defined and

- 170 -

R_{10} denotes a hydrogen atom, a methyl, ethyl, acetyl or methylsulfonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally

- 171 -

substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is as hereinbefore defined,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is as hereinbefore defined,

a $R_{11}NR_5$ group wherein R_5 is as hereinbefore defined and

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl, aryl, $R_3CO-O-(R_6CR_f)-O-CO$ or $(R_7O-PO-OR_8)$ group wherein R_6 to R_9 and R_7 and R_8 are as hereinbefore defined,

F denotes an $-O-C_{1-4}$ -alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_5 to R_9 are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or

- 173 -

bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ and R₁₀ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at cyclic carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ and R₁₀ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group and additionally at cyclic carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ and R₁₀ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, while the abovementioned

- 174 -

tioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a C_{1-4} -alkyl or $R_6O-CO-C_{1-4}$ -alkyl group, while R_6 is as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups in each case are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a di- $(C_{1-4}$ -alkoxy)-methyl group, while R_5 is as hereinbefore defined,

- 175 -

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is as hereinbefore defined,

a R_hNR_5 group wherein R_5 is as hereinbefore defined and R_h denotes a substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally by one or two methyl groups, or

F and G together denote a hydrogen atom,

a C_{1-4} -alkoxy group optionally substituted from position 2 onwards by a hydroxy or C_{1-4} -alkoxy group,

a C_{1-4} -alkoxy group which is substituted by an R_6O-CO group, where R_6 is as hereinbefore defined, or

a C_{4-7} -cycloalkoxy or C_{3-7} -cycloalkyl- C_{1-4} -alkoxy group

with the proviso that at least one of the groups E, G or F together with G contains an R_6O-CO , $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ group or

D together with E contains an $R_9CO-O-(R_8CR_f)-O-CO$ or $(R_7O-PO-OR_8)$ group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a C_{1-4} -alkoxy group,

a di- $(C_{1-4}$ -alkoxy)-methyl group or

- 176 -

an optionally substituted 1,3-dioxolan-2-yl, 1,3-dioxan-2-yl, 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group or

E contains an optionally substituted 2-oxo-thiomorpholino group or an optionally substituted 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may in each case be monosubstituted by R_{12} , mono- or disubstituted by R_{13} or monosubstituted by R_{12} and additionally mono- or disubstituted by R_{13} , wherein the substituents may be identical or different and

R_{12} denotes a cyano, C_{1-2} -alkoxycarbonyl, aminocarbonyl, C_{1-2} -alkylaminocarbonyl, di- $(C_{1-2}$ -alkyl)-aminocarbonyl, C_{1-2} -alkylsulphenyl, C_{1-2} -alkylsulphinyl, C_{1-2} -alkylsulphonyl, hydroxy, nitro, amino, C_{1-2} -alkylamino or di- $(C_{1-2}$ -alkyl)-amino group and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-5} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

3. Bicyclic heterocycles of general formula I according to claim 1, wherein

R_a denotes a hydrogen atom,

- 177 -

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , while

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom, or a methyl, trifluoromethyl, methoxy, ethynyl or cyano group,

R_3 denotes a hydrogen atom,

R_c and R_d in each case denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,1- or 1,2-vinylene group,

an ethynylene group or

a 1,3-butadien-1,4-ylene group,

D denotes a C_{1-4} -alkylene group,

a $-CO-NR_4$ -alkylene group wherein the alkylene moiety contains 2 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group, wherein

R_4 denotes a hydrogen atom,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

- 178 -

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while

R_5 denotes a hydrogen atom,

a C_{1-4} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a C_{1-4} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-methylcarbonylsulphenyl group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a hydroxy, C_{1-4} -alkylcarbonyloxy, arylcarbonyloxy or aryl-methylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

a C_{3-6} -cycloalkyl or C_{3-6} -cycloalkyl-methyl group,

R_6 , R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom,

a C_{1-8} -alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexyl-methyl group,

an aryl, arylmethyl or $R_9CO-O-(R_eCR_f)$ group, while

- 179 -

R_e denotes a hydrogen atom or a C_{1-4} -alkyl group,

R_f denotes a hydrogen atom and

R_g denotes a C_{1-4} -alkyl, cyclopentyl, cyclohexyl, C_{1-4} -alkoxy, cyclopentyloxy or cyclohexyloxy group,

and R_h denotes a methyl or ethyl group,

a pyrrolidino or piperidino group which is substituted by an R_eO-CO or $R_eO-CO-C_{1-2}$ -alkyl group wherein R_e is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_eO-CO or $R_eO-CO-C_{1-2}$ -alkyl groups wherein R_e is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_eO-CO or $R_eO-CO-C_{1-2}$ -alkyl group, wherein R_e is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl, ethyl, acetyl or methylsulfonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_eO-CO-C_{1-4}$ -alkyl, bis- $(R_eO-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_e to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_eO-CO-C_{1-2}$ -alkyl group and is additionally substituted at a cyclic carbon atom by an R_eO-CO or $R_eO-CO-C_{1-2}$ -alkyl group wherein R_e is as hereinbefore defined,

- 180 -

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 or 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 , 1,3-dioxolan-2-yl-methyl- NR_5 or 1,3-dioxan-2-yl-methyl- NR_5 group wherein R_5 is as hereinbefore defined,

a N-methyl- $R_{11}N$ or N-ethyl- $R_{11}N$ group wherein

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes a hydrogen atom,

- 181 -

a methyl, trifluoromethyl, aryl, $R_6\text{CO-O-(R}_e\text{CR}_f\text{)-O-CO}$ or $(R_7\text{O-PO-OR}_8)$ group wherein R_e to R_g and R_7 and R_8 are as hereinbefore defined,

F denotes an $\text{-O-C}_{1-4}\text{-alkylene}$ group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an $R_6\text{O-CO-alkylene-NR}_5$ group wherein the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two $\text{C}_{1-2}\text{-alkyl}$ groups or by an $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group, while R_5 and R_6 are as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by an $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an $R_6\text{O-CO}$, or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group, while R_6 and R_{10} are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6\text{O-CO-C}_{1-4}\text{-alkyl}$, bis- $(R_6\text{O-CO})\text{-C}_{1-4}\text{-alkyl}$ or $(R_7\text{O-PO-OR}_8)\text{-C}_{1-2}\text{-alkyl}$ group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group and additionally at a cyclic carbon atom by an $R_6\text{O-CO}$ or $R_6\text{O-CO-C}_{1-2}\text{-alkyl}$ group wherein R_6 is as hereinbefore defined,

- 182 -

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a methyl, ethyl or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined and the abovementioned 2-oxo-morpholinyl groups are each linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 , 1,3-dioxolan-2-yl-methyl- NR_5 or 1,3-dioxan-2-yl-methyl- NR_5 - group or

F and G together denote a hydrogen atom,

a methoxy or ethoxy group,

a C_{1-3} -alkoxy group which is substituted by an R_6O-CO group, while R_6 is as hereinbefore defined,

a C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group

- 183 -

with the proviso that at least one of the groups E, G or F together with G contains an R_6O-CO , $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ group or

D together with E contains an $R_9CO-O-(R_eCR_f)-O-CO$ or $(R_7O-PO-OR_8)$ group or

E or G contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a dimethoxymethyl or diethoxymethyl group or

an optionally substituted 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl- group or

E contains an optionally substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-thiomorpholino, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R_{13} , while the substituents may be identical or different and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-4} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

- 184 -

the tautomers, the stereoisomers and the salts thereof.

4. Bicyclic heterocycles of general formula I according to claim 1, wherein

R_a denotes a hydrogen atom,

R_b denotes a phenyl, benzyl or 1-phenylethyl group wherein the phenyl nucleus is substituted in each case by the groups R_1 to R_3 , wherein

R_1 and R_2 , which may be identical or different, each denote a hydrogen, fluorine, chlorine or bromine atom or a methyl group and

R_3 denotes a hydrogen atom,

R_c and R_d each denote a hydrogen atom,

X denotes a methine group substituted by a cyano group, or a nitrogen atom,

A denotes an imino group,

B denotes a carbonyl group,

C denotes a 1,2-vinylene or an ethynylene group,

D denotes a C_{1-4} -alkylene group,

a $-CO-NR_4$ -alkylene group wherein the alkylene moiety contains 2 or 3 carbon atoms, while the linking to the adjacent group C must take place via the carbonyl group wherein

R_4 denotes a hydrogen atom,

- 185 -

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene- NR_5 or $(R_7O-PO-OR_8)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while

R_5 denotes a hydrogen atom,

a C_{1-2} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl groups, which is terminally substituted by a hydroxy, C_{1-2} -alkylcarbonylsulphenyl or C_{1-2} -alkylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

R_6 denotes a hydrogen atom,

a C_{1-8} -alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

a phenyl group optionally substituted by one or two methyl groups, a phenylmethyl group which may be substituted in the phenyl moiety by one or two methyl groups, a 5-indanyl group or an $R_9CO-O-(R_eCR_f)$ group, while

R_e denotes a hydrogen atom or a methyl group,

R_f denotes a hydrogen atom and

R_9 denotes a C_{1-4} -alkyl or C_{1-2} -alkoxy group,

- 186 -

R_7 and R_8 , which may be identical or different, each denote a hydrogen atom, a methyl, ethyl or phenyl group,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or R_6O-CO -methyl group, wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or R_6O-CO -methyl groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO group, while R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl, ethyl, acetyl or methylsulfonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R_6O-CO -methyl group and additionally at a cyclic carbon atom by an R_6O-CO group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO - group, while R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

- 187 -

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl-NR₅, 2,2-diethoxyethyl-NR₅ or 1,3-dioxolan-2-yl-methyl-NR₅- group wherein R₅ is as hereinbefore defined,

an N-methyl-R₁₁N or N-ethyl-R₁₁N group wherein

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group,

or D together with E denotes a hydrogen atom,

a methyl group or an R_gCO-O-(R_eCR_f)-O-CO group wherein R_e to R_g are as hereinbefore defined,

F denotes a -O-C₁₋₄-alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an R_eO-CO-alkylene-NR₅ group wherein the alkylene moiety, which is straight-chained and contains 1 or 2 carbon atoms, may additionally be substituted by a methyl group or by an R_eO-CO or R_eO-CO-methyl group, while R₅ and R_e are as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by an R_eO-CO or R_eO-CO-methyl group wherein R_e is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_eO-CO or R_eO-CO-methyl groups wherein R_e is as hereinbefore defined,

- 188 -

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperidiny1 group substituted in the 1 position by an $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined, or

F and G together denote a hydrogen atom,

a methoxy or ethoxy group,

a C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group,

with the proviso that at least one of the groups E or G contains an R_6O-CO or $(R_7O-PO-OR_8)$ group or

D together with E contains an $R_6CO-O-(R_6CR_f)-O-CO$ group or

E contains an optionally substituted 2-oxo-morpholinyl group,

a morpholino group substituted in the 2 position or in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a dimethoxymethyl or diethoxymethyl group or

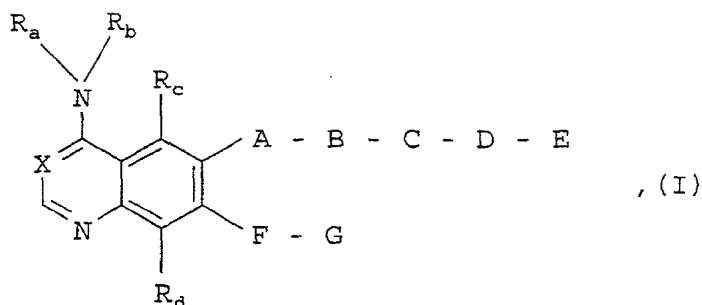
a 1,3-dioxolan-2-yl, 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group or

an optionally substituted 2-oxo-thiomorpholino group,

the tautomers, the stereoisomers and the salts thereof.

5. Bicyclic heterocycles of general formula

- 189 -



wherein

R_a to R_d , A to C and X are defined as in claim 1,

D denotes an alkylene, -CO-alkylene or -SO₂-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms and additionally 1 to 4 hydrogen atoms in the alkylene moiety may be replaced by fluorine atoms, whilst the linking of the -CO-alkylene and -SO₂-alkylene group to the adjacent group C in each case must take place via the carbonyl or sulphonyl group,

a -CO-O-alkylene, -CO-NR₄-alkylene or -SO₂-NR₄-alkylene group wherein the alkylene moiety in each case contains 1 to 8 carbon atoms, whilst the linking to the adjacent group C in each case must take place via the carbonyl or sulphonyl group wherein

R_4 denotes a hydrogen atom or a C₁₋₄-alkyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅-group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon

- 190 -

atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, wherein

R_5 denotes a hydrogen atom,

a C_{1-4} -alkyl group, which may be substituted by an R_6O-CO , $(R_7O-PO-OR_8)$ or $(R_7O-PO-R_9)$ group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, which may be terminally substituted in each case by a C_{1-6} -alkylcarbonylsulphenyl, C_{3-7} -cycloalkylcarbonylsulphenyl, C_{3-7} -cycloalkyl- C_{1-3} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl- C_{1-3} -alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which may be terminally substituted in each case by a C_{1-6} -alkylcarbonyloxy, C_{3-7} -cycloalkylcarbonyloxy, C_{3-7} -cycloalkyl- C_{1-3} -alkylcarbonyloxy, arylcarbonyloxy or aryl- C_{1-3} -alkylcarbonyloxy group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups, each of which may be terminally substituted by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group,

a C_{3-7} -cycloalkyl or C_{3-7} -cycloalkyl- C_{1-3} -alkyl group,

R_6 , R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom,

a C_{1-8} -alkyl group, which may be substituted by a hydroxy, C_{1-4} -alkoxy, amino, C_{1-4} -alkylamino or di- $(C_{1-4}$ -alkyl)-amino

- 191 -

group or by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom or by a sulphinyl, sulphonyl, imino or N-(C₁₋₄-alkyl)-imino group,

a C₄₋₇-cycloalkyl group optionally substituted by 1 or 2 methyl groups,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, wherein the unsaturated part may not be linked to the oxygen atom,

a C₃₋₇-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f)-group, whilst

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₇-cycloalkyl, C₁₋₄-alkoxy or C₃₋₇-cycloalkoxy group,

and R_g denotes a C₁₋₄-alkyl, aryl or aryl-C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which may be substituted by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆OCO or R₆OCO-C₁₋₄-alkyl groups or by an R₆OCO-group and an R₆OCO-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R₁₀ and is additionally substituted at a cyclic carbon atom by an R₆O-CO, (R₇O-PO-OR₈), (R₇O-PO-R₉), R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl

- 192 -

or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined and

R_{10} denotes a hydrogen atom, a C_{1-4} -alkyl, formyl, C_{1-4} -alkylcarbonyl or C_{1-4} -alkylsulphonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the abovementioned

- 193 -

tioned 5- to 7-membered rings are additionally substituted in each case at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C_{1-2} -alkyl groups,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

- 194 -

a morpholino or thiomorpholino group which is substituted in the 2 and 6 positions by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group, whilst R₅ is as hereinbefore defined,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group optionally substituted by one or two methyl groups, while R₅ is as hereinbefore defined,

an R₁₁NR₅-group wherein R₅ is as hereinbefore defined and

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an R₆CO-O-(R₆CR_f)-O-CO, (R₇O-PO-OR₈) or (R₇O-PO-R₉)-group wherein R₆ to R₉ and R₇ to R₉ are as hereinbefore defined,

F and G together denote a hydrogen atom,

a C₁₋₆-alkoxy group optionally substituted from position 2 onwards by a hydroxy or C₁₋₄-alkoxy group,

a C₃₋₇-cycloalkoxy or C₃₋₇-cycloalkyl-C₁₋₄-alkoxy group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in

- 195 -

each case may be monosubstituted by R_{12} , mono-, di- or trisubstituted by R_{13} or monosubstituted by R_{12} and additionally mono- or disubstituted by R_{13} , whilst the substituents may be identical or different and

R_{12} denotes a cyano, carboxy, C_{1-4} -alkoxycarbonyl, aminocarbonyl, C_{1-4} -alkylaminocarbonyl, di- $(C_{1-4}$ -alkyl)-aminocarbonyl, C_{1-4} -alkylsulphenyl, C_{1-4} -alkylsulphinyl, C_{1-4} -alkylsulphonyl, hydroxy, C_{1-4} -alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C_{1-4} -alkylamino, di- $(C_{1-4}$ -alkyl)-amino, C_{1-4} -alkylcarbonylamino, N- $(C_{1-4}$ -alkyl)- C_{1-4} -alkylcarbonylamino, C_{1-4} -alkylsulphonylamino, N- $(C_{1-4}$ -alkyl)- C_{1-4} -alkylsulphonylamino, aminosulphonyl, C_{1-4} -alkylaminosulphonyl or di- $(C_{1-4}$ -alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino-group, and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-4} -alkyl, trifluoromethyl or C_{1-4} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a $C_{3,5}$ -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

6. Bicyclic heterocycles of general formula I according to claim 5, wherein

R_a to R_d , A to C and X are defined as in claim 2,

D denotes an alkylene or -CO-alkylene group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking of the -CO-alkylene group to the adjacent group C in each case must take place via the carbonyl group,

- 196 -

a -CO-O-alkylene or -CO-NR₄-alkylene- group wherein the alkylene moiety in each case contains 1 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group wherein

R₄ denotes a hydrogen atom or a methyl or ethyl group,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl or sulphonyl group,

E denotes an R₆O-CO-alkylene-NR₅, (R₇O-PO-OR₈)-alkylene-NR₅ or (R₇O-PO-R₉)-alkylene-NR₅ group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C₁₋₂-alkyl groups or by an R₆O-CO or R₆O-CO-C₁₋₂-alkyl group, while

R₅ denotes a hydrogen atom,

a C₁₋₄-alkyl group which may be substituted by an R₆O-CO group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a hydroxy, C₁₋₄-alkoxy, di-(C₁₋₄-alkyl)amino, C₁₋₆-alkylcarbonylsulphenyl, C₃₋₆-cycloalkylcarbonylsulphenyl, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonylsulphenyl, arylcarbonylsulphenyl or aryl-C₁₋₃-alkylcarbonylsulphenyl group,

an ethyl or propyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted in each case by a C₁₋₆-alkylcarbonyloxy, C₃₋₆-cycloalkylcarbonyloxy, C₃₋₆-cycloalkyl-C₁₋₃-alkylcarbonyloxy, arylcarbonyloxy or aryl-C₁₋₃-alkylcarbonyloxy group,

- 197 -

a C₃₋₆-cycloalkyl or C₃₋₆-cycloalkyl-C₁₋₃-alkyl group,

R₆, R₇ and R₈, which may be identical or different, in each case denote a hydrogen atom,

a C₁₋₈-alkyl group which may be substituted by a hydroxy, C₁₋₄-alkoxy, or di-(C₁₋₄-alkyl)-amino group or by a 4- to 7-membered alkyleneimino group, while in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen atom or by an N-(C₁₋₂-alkyl)-imino group,

a C₄₋₆-cycloalkyl group,

a C₃₋₅-alkenyl or C₃₋₅-alkynyl group, while the unsaturated moiety may not be linked to the oxygen atom,

a C₃₋₆-cycloalkyl-C₁₋₄-alkyl, aryl, aryl-C₁₋₄-alkyl or R_gCO-O-(R_eCR_f) group, while

R_e and R_f, which may be identical or different, in each case denote a hydrogen atom or a C₁₋₄-alkyl group and

R_g denotes a C₁₋₄-alkyl, C₃₋₆-cycloalkyl, C₁₋₄-alkoxy or C₅₋₆-cycloalkoxy group,

and R_h denotes a C₁₋₄-alkyl group,

a 4- to 7-membered alkyleneimino group which is substituted by an R₆O-CO, R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ is as hereinbefore defined,

a 4- to 7-membered alkyleneimino group which is substituted by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is as hereinbefore defined,

- 198 -

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl, ethyl, acetyl or methylsulfonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are as hereinbefore defined,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and is additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl, or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or

- 199 -

bis-(R₆O-CO)-C₁₋₄-alkyl group wherein R₆ and R₁₀ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R₁₀, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ and R₁₀ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl, bis-(R₆O-CO)-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group wherein R₆ to R₉ are as hereinbefore defined,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an R₆O-CO-C₁₋₄-alkyl or bis-(R₆O-CO)-C₁₋₄-alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups wherein R₆ is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 4 C₁₋₂-alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 4 C₁₋₂-alkyl groups,

a morpholino group which is substituted in the 2 position by a C₁₋₄-alkoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained, is terminally substituted by a di-(C₁₋₄-alkoxy)-methyl group, while R₅ is as hereinbefore defined,

- 200 -

a C_{1-4} -alkyl- NR_5 group wherein the C_{1-4} -alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R_5 is as hereinbefore defined,

a $R_{11}NR_5$ group wherein R_5 is as hereinbefore defined and

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an $R_gCO-O-(R_eCR_f)-O-CO$ or $(R_7O-PO-OR_8)$ group wherein R_e to R_g and R_7 to R_8 are as hereinbefore defined,

F and G together denote a hydrogen atom,

a C_{1-6} -alkoxy group optionally substituted from position 2 by a hydroxy or C_{1-4} -alkoxy group,

a C_{4-7} -cycloalkoxy or C_{3-7} -cycloalkyl- C_{1-4} -alkoxy group,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R_{12} , mono- or disubstituted by R_{13} or monosubstituted by R_{12} and additionally mono- or disubstituted by R_{13} , whilst the substituents may be identical or different and

R_{12} denotes a cyano, C_{1-2} -alkoxycarbonyl, aminocarbonyl, C_{1-2} -alkylaminocarbonyl, di- $(C_{1-2}$ -alkyl)-aminocarbonyl, C_{1-2} -alkylsulphenyl, C_{1-2} -alkylsulphinyl, C_{1-2} -alkylsulphonyl, hy-

- 201 -

droxy, nitro, amino, C_{1-2} -alkylamino or di- $(C_{1-2}$ -alkyl)-amino, and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-5} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

7. Bicyclic heterocycles of general formula I according to claim 5, wherein

R_a to R_d , A to C and X are defined as in claim 3,

D denotes a C_{1-4} -alkylene group,

a $-CO-NR_4$ -alkylene group wherein the alkylene moiety contains 2 to 4 carbon atoms, while the linking to the adjacent group C in each case must take place via the carbonyl group, wherein

R_4 denotes a hydrogen atom,

or, if D is bound to a carbon atom of the group E, it may also denote a bond

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while

- 202 -

R_5 denotes a hydrogen atom,

a C_{1-4} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a C_{1-4} -alkylcarbonylsulphenyl, arylcarbonylsulphenyl or arylmethylcarbonylsulphenyl group,

an ethyl group optionally substituted by one or two methyl or ethyl groups which is terminally substituted by a hydroxy, C_{1-4} -alkylcarbonyloxy, arylcarbonyloxy or arylmethylcarbonyloxy group,

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

a C_{3-6} -cycloalkyl or C_{3-6} -cycloalkyl-methyl group,

R_6 , R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom,

a C_{1-8} -alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

an aryl, arylmethyl or $R_9CO-O-(R_eCR_f)$ group, wherein

R_e denotes a hydrogen atom or a C_{1-4} -alkyl group,

R_f denotes a hydrogen atom and

R_9 denotes a C_{1-4} -alkyl, cyclopentyl, cyclohexyl, C_{1-4} -alkoxy, cyclopentyloxy or cyclohexyloxy group,

and R_g denotes a methyl or ethyl group,

- 203 -

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined and

R_{10} denotes a hydrogen atom, a methyl, ethyl, acetyl or methylsulfonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-2}$ -alkyl group and is additionally substituted at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is as hereinbefore defined,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

- 204 -

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C₁₋₂-alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl-NR₅, 2,2-diethoxyethyl-NR₅, 1,3-dioxolan-2-yl-methyl-NR₅ or 1,3-dioxan-2-yl-methyl-NR₅ group wherein R₅ is as hereinbefore defined,

a N-methyl-R₁₁N or N-ethyl-R₁₁N group wherein

R₁₁ denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl, 2-oxo-tetrahydropyran-5-yl, 2-oxo-tetrahydrothiophen-3-yl, 2-oxo-tetrahydrothiophen-4-yl, 2-oxo-tetrahydrothiopyran-3-yl, 2-oxo-tetrahydrothiopyran-4-yl or 2-oxo-tetrahydrothiopyran-5-yl group optionally substituted by one or two methyl groups,

or D together with E denotes an R₆CO-O-(R₆CR_f)-O-CO or (R₇O-PO-OR₈) group wherein R₆ to R₉ and R₇ and R₈ are as hereinbefore defined,

F and G together denote a hydrogen atom, a methoxy, ethoxy, C₄₋₆-cycloalkoxy or C₃₋₆-cycloalkyl-C₁₋₃-alkoxy group,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R₁₃, while the substituents may be identical or different and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

- 205 -

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-4} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

8. Bicyclic heterocycles of general formula I according to claim 5, wherein

R_a to R_d , A to C and X are defined as in claim 4,

D denotes a C_{1-4} -alkylene group,

a $-CO-NR_4$ -alkylene group wherein the alkylene moiety contains 2 or 3 carbon atoms, while the linking to the adjacent group C must take place via the carbonyl group wherein

R_4 denotes a hydrogen atom,

or, if D is bound to a nitrogen atom of the group E, it may also denote a carbonyl group,

E denotes an R_6O-CO -alkylene- NR_5 or $(R_7O-PO-OR_8)$ -alkylene- NR_5 group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while

R_5 denotes a hydrogen atom,

a C_{1-2} -alkyl group which may be substituted by an R_6O-CO group,

an ethyl group optionally substituted by one or two methyl groups, which is terminally substituted by a hydroxy, C_{1-2} -alkylcarbonylsulphenyl or C_{1-2} -alkylcarbonyloxy group,

- 206 -

a 2,2-dimethoxyethyl or 2,2-diethoxyethyl group,

R_6 denotes a hydrogen atom,

a C_{1-8} -alkyl group,

a cyclopentyl, cyclopentylmethyl, cyclohexyl or cyclohexylmethyl group,

a phenyl group optionally substituted by one or two methyl groups, a phenylmethyl group which may be substituted in the phenyl moiety by one or two methyl groups, a 5-indanyl group or an $R_9CO-O-(R_eCR_f)$ group, while

R_e denotes a hydrogen atom or a methyl group,

R_f denotes a hydrogen atom and

R_9 denotes a C_{1-4} -alkyl or C_{1-2} -alkoxy group,

R_7 and R_8 , which may be identical or different, in each case denote a hydrogen atom, a methyl, ethyl or phenyl group,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or R_6O-CO -methyl group, wherein R_6 is as hereinbefore defined,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or R_6O-CO -methyl groups wherein R_6 is as hereinbefore defined,

a piperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO group, while R_6 is as hereinbefore defined and

- 207 -

R_{10} denotes a hydrogen atom, a methyl, ethyl, acetyl or methylsulfonyl group,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are as hereinbefore defined,

a piperazino group which is substituted in the 4 position by an R_6O-CO -methyl group and additionally at a cyclic carbon atom by an R_6O-CO group wherein R_6 is as hereinbefore defined,

a morpholino group which is substituted by an R_6O-CO - group, wherein R_6 is as hereinbefore defined,

a 2-oxo-morpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a 2-oxo-thiomorpholino group which may be substituted by 1 to 2 C_{1-2} -alkyl groups,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 or 1,3-dioxolan-2-yl-methyl- NR_5 - group wherein R_5 is as hereinbefore defined,

an N-methyl- $R_{11}N$ or N-ethyl- $R_{11}N$ group wherein

R_{11} denotes a 2-oxo-tetrahydrofuran-3-yl or 2-oxo-tetrahydrofuran-4-yl group,

- 208 -

or D together with E denotes an $R_g\text{CO-O-(R}_e\text{CR}_f\text{)-O-CO}$ group wherein R_e to R_g are as hereinbefore defined,

F and G together denote a hydrogen atom,

a methoxy, ethoxy, C_{4-6} -cycloalkoxy or C_{3-6} -cycloalkyl- C_{1-3} -alkoxy group,

the tautomers, the stereoisomers and the salts thereof.

9. Bicyclic heterocycles of general formula I according to at least one of claims 5 to 8, characterised in that R_b denotes one of the optionally substituted 1-phenyl-ethyl groups mentioned in the respective claim 5, 6, 7 or 8,

the tautomers, the stereoisomers and the salts thereof.

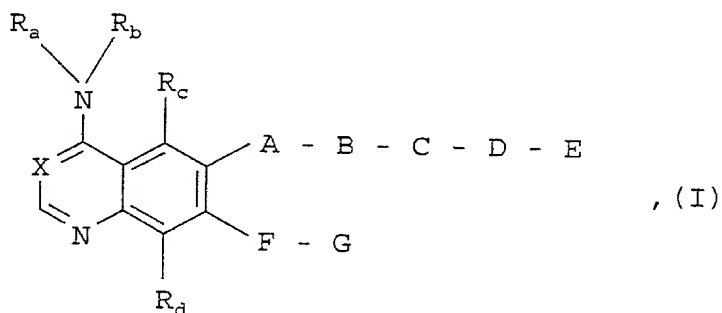
10. Bicyclic heterocycles of general formula I according to at least one of claims 5 to 8, characterised in that F and G together denote one of the cycloalkoxy or cycloalkyl-alkoxy groups mentioned in the respective claim 5, 6, 7 or 8,

the tautomers, the stereoisomers and the salts thereof.

11. Bicyclic heterocycles of general formula I according to at least one of claims 5 to 8, characterised in that E denotes one of the optionally substituted 2-oxo-morpholino groups mentioned in the respective claim 5, 6, 7 or 8.

12. Bicyclic heterocycles of general formula

- 209 -



wherein

R_a to R_d , A to C and X are defined as in claim 1,

D together with E denotes a hydrogen atom,

a C_{1-4} -alkyl group optionally substituted by 1 to 5 fluorine atoms,

a C_{3-6} -cycloalkyl group,

an aryl, heteroaryl, C_{1-4} -alkylcarbonyl, arylcarbonyl or C_{1-4} -alkoxycarbonyl group,

an aminocarbonyl, C_{1-4} -alkylaminocarbonyl or di- $(C_{1-4}$ -alkyl)-aminocarbonyl group or

a carbonyl group, which is substituted by a 4- to 7-membered alkyleneimino group, whilst in the abovementioned 6- to 7-membered alkyleneimino groups, a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by an imino group substituted by the group R_{10} , by a sulphinyl or sulphonyl group, wherein R_{10} is defined as in claim 1,

F denotes a C_{1-6} -alkylene group, a $-O-C_{1-6}$ -alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, whilst the latter may not be linked to a nitrogen atom of the group G, and

- 210 -

G denotes an R_6O-CO -alkylene- NR_5 , $(R_7O-PO-OR_8)$ -alkylene- NR_5 or $(R_7O-PO-R_9)$ -alkylene- NR_5 -group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 6 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, wherein R_5 to R_9 are defined as in claim 1,

a 4- to 7-membered alkyleneimino group which is substituted by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group and is

- 211 -

additionally substituted at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , whilst the abovementioned 5- to 7-membered rings are in each case additionally substituted at a carbon atom by an R_6O-CO , $(R_7O-PO-OR_8)$, $(R_7O-PO-R_9)$, $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_{10} are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups or by an R_6O-CO -group and an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 1,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-$

- 212 -

C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group, while the abovementioned 5- to 7-membered rings are in each case additionally substituted at carbon atoms by one or two R₆O-CO or R₆O-CO-C₁₋₄-alkyl groups or by an R₆O-CO-group and an R₆O-CO-C₁₋₄-alkyl group wherein R₆ to R₉ are defined as in claim 1,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a hydrogen atom, by a C₁₋₄-alkyl, R₆O-CO-C₁₋₄-alkyl, (R₇O-PO-OR₈)-C₁₋₄-alkyl or (R₇O-PO-R₉)-C₁₋₄-alkyl group, while R₆ to R₉ are defined as in claim 1 and the abovementioned 2-oxo-morpholinyl groups are in each case linked to a carbon atom of the group F,

a morpholino or thiomorpholino group which is substituted in the 2 position by a C₁₋₄-alkoxy group,

a morpholino or thiomorpholino group which is substituted in the 2 and 6 position by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is in each case terminally substituted by a di-(C₁₋₄-alkoxy)-methyl or tri-(C₁₋₄-alkoxy)-methyl group, whilst R₅ is defined as in claim 1,

a C₁₋₄-alkyl-NR₅-group wherein the C₁₋₄-alkyl moiety, which is straight-chained and may additionally be substituted by one or two methyl groups, is terminally substituted in each case by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl-group optionally substituted by one or two methyl groups, while R₅ is defined as in claim 1,

- 213 -

an R_hNR_s -group wherein R_s is as hereinbefore defined and R_h denotes a 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally substituted by one or two methyl groups,

whilst by the aryl moieties mentioned in the definitions of the abovementioned groups is meant a phenyl group which in each case may be monosubstituted by R_{12} , mono-, di- or tri-substituted by R_{13} or monosubstituted by R_{12} and additionally mono- or disubstituted by R_{13} , whilst the substituents may be identical or different and

R_{12} denotes a cyano, carboxy, C_{1-4} -alkoxycarbonyl, aminocarbonyl, C_{1-4} -alkylaminocarbonyl, di- $(C_{1-4}$ -alkyl)-aminocarbonyl, C_{1-4} -alkylsulphenyl, C_{1-4} -alkylsulphinyl, C_{1-4} -alkylsulphonyl, hydroxy, C_{1-4} -alkylsulphonyloxy, trifluoromethyloxy, nitro, amino, C_{1-4} -alkylamino, di- $(C_{1-4}$ -alkyl)-amino, C_{1-4} -alkyl-carbonylamino, N- $(C_{1-4}$ -alkyl)- C_{1-4} -alkylcarbonylamino, C_{1-4} -alkylsulphonylamino, N- $(C_{1-4}$ -alkyl)- C_{1-4} -alkylsulphonylamino, aminosulphonyl, C_{1-4} -alkylaminosulphonyl or di- $(C_{1-4}$ -alkyl)-aminosulphonyl group or a carbonyl group, which is substituted by a 5- to 7-membered alkyleneimino group, wherein in the abovementioned 6- to 7-membered alkyleneimino groups in each case a methylene group in the 4 position may be replaced by an oxygen or sulphur atom, by a sulphinyl, sulphonyl, imino or N- $(C_{1-4}$ -alkyl)-imino group, and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-4} -alkyl, trifluoromethyl or C_{1-4} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-5} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

and moreover, the heteroaryl groups mentioned in the definitions of the abovementioned groups also include a 5-membered

- 214 -

heteroaromatic group which contains an imino group, an oxygen or sulphur atom or an imino group, an oxygen or sulphur atom and one or two nitrogen atoms, or

a 6-membered heteroaromatic group which contains one, two or three nitrogen atoms,

whilst the abovementioned 5-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups and the abovementioned 6-membered heteroaromatic groups may be substituted in each case by 1 or 2 methyl or ethyl groups or by a fluorine, chlorine, bromine or iodine atom, or by a tri-fluoromethyl, hydroxy, methoxy or ethoxy group,

the tautomers, the stereoisomers and the salts thereof.

13. Bicyclic heterocycles of general formula I according to claim 12, wherein

R_a to R_d , A to C and X are defined as in claim 2,

D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl or aryl group,

F denotes an $-O-C_{1-4}$ -alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R_eO-CO -alkylene- NR_s , $(R_7O-PO-OR_8)$ -alkylene- NR_s or $(R_7O-PO-R_9)$ -alkylene- NR_s group wherein in each case the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_eO-CO or $R_eO-CO-C_{1-2}$ -alkyl group, while R_s to R_9 are defined as in claim 2,

- 215 -

a 4- to 7-membered alkyleneimino group which is substituted by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is defined as in claim 2,

a 4- to 7-membered alkyleneimino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at a cyclic carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by the group R_{10} and is additionally substituted at cyclic carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in each case in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 2,

a piperazino or homopiperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group and additionally at cyclic carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a morpholino or homomorpholino group which is substituted in each case by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 is defined as in claim 2,

a morpholino or homomorpholino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at a carbon atom by an R_6O-CO , $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group wherein R_6 and R_{10} are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by the group R_{10} , while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 and R_{10} are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl, $(R_7O-PO-OR_8)-C_{1-4}$ -alkyl or $(R_7O-PO-R_9)-C_{1-4}$ -alkyl group wherein R_6 to R_9 are defined as in claim 2,

a pyrrolidinyl, piperidinyl or hexahydroazepinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl or bis- $(R_6O-CO)-C_{1-4}$ -alkyl group, while the abovementioned 5- to 7-membered rings in each case are additionally substituted at carbon atoms by one or two R_6O-CO or $R_6O-CO-C_{1-4}$ -alkyl groups wherein R_6 is defined as in claim 2,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a C_{1-4} -alkyl or $R_6O-CO-C_{1-4}$ -alkyl group, while R_6 is defined as in claim 2 and the abovementioned 2-oxo-morpholinyl groups are each are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a C_{1-4} -alkoxy group,

- 217 -

a morpholino group which is substituted in the 2 and 6 positions in each case by a C₁₋₄-alkoxy group,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained, is terminally substituted by a di-(C₁₋₄-alkoxy)-methyl group, while R₅ is defined as in claim 2,

a C₁₋₄-alkyl-NR₅ group wherein the C₁₋₄-alkyl moiety, which is straight-chained, is terminally substituted by a 1,3-dioxolan-2-yl or 1,3-dioxan-2-yl group, while R₅ is defined as in claim 2,

a R_nNR₅ group wherein R₅ is defined as in claim 2 and R_n denotes a substituted 2-oxo-tetrahydrofuran-3-yl, 2-oxo-tetrahydrofuran-4-yl, 2-oxo-tetrahydropyran-3-yl, 2-oxo-tetrahydropyran-4-yl or 2-oxo-tetrahydropyran-5-yl group optionally by one or two methyl groups,

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may in each case be monosubstituted by R₁₂, mono- or disubstituted by R₁₃ or monosubstituted by R₁₂ and additionally mono or disubstituted by R₁₃, while the substituents may be identical or different and

R₁₂ denotes a cyano, C₁₋₂-alkoxycarbonyl, aminocarbonyl, C₁₋₂-alkylaminocarbonyl, di-(C₁₋₂-alkyl)-aminocarbonyl, C₁₋₂-alkylsulphenyl, C₁₋₂-alkylsulphinyl, C₁₋₂-alkylsulphonyl, hydroxy, nitro, amino, C₁₋₂-alkylamino or di-(C₁₋₂-alkyl)-amino group and

R₁₃ denotes a fluorine, chlorine, bromine or iodine atom, a C₁₋₂-alkyl, trifluoromethyl or C₁₋₂-alkoxy group or

two groups R₁₃, if they are bound to adjacent carbon atoms, together denote a C₃₋₅-alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

- 218 -

the tautomers, the stereoisomers and the salts thereof.

14. Bicyclic heterocycles of general formula I according to claim 12, wherein

R_a to R_d , A to C and X are defined as in claim 3,

D together with E denotes a hydrogen atom,

a methyl, trifluoromethyl or aryl group,

F denotes an $-O-C_{1-4}$ -alkylene group, wherein the alkylene moiety is linked to the group G, or an oxygen atom, while this may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 group wherein the alkylene moiety, which is straight-chained and contains 1 to 4 carbon atoms, may additionally be substituted by one or two C_{1-2} -alkyl groups or by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_5 and R_6 are defined as in claim 3,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is defined as in claim 3,

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl groups wherein R_6 is defined as in claim 3,

a piperazino group which is substituted in the 4 position by the group R_{10} and additionally at a cyclic carbon atom by an R_6O-CO , or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 and R_{10} are defined as in claim 3,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are defined as in claim 3,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-2}$ -alkyl group and additionally at a cyclic carbon atom by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is defined as in claim 3,

a morpholino group which is substituted by an R_6O-CO or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is defined as in claim 3,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are defined as in claim 3,

a 2-oxo-morpholino group which may be substituted by 1 or 2 methyl groups,

a 2-oxo-morpholinyl group which is substituted in the 4 position by a methyl, ethyl or $R_6O-CO-C_{1-2}$ -alkyl group, while R_6 is defined as in claim 3 and the abovementioned 2-oxo-morpholinyl groups in each case are linked to a carbon atom of the group F,

a morpholino group which is substituted in the 2 position by a methoxy or ethoxy group,

a morpholino group which is substituted in the 2 and 6 positions in each case by a methoxy or ethoxy group,

a 2,2-dimethoxyethyl- NR_5 , 2,2-diethoxyethyl- NR_5 , 1,3-dioxolan-2-yl-methyl- NR_5 or 1,3-dioxan-2-yl-methyl- NR_5 group wherein R_5 is defined as in claim 3,

- 220 -

while the aryl moieties mentioned in the definition of the abovementioned groups denote a phenyl group which may be mono- or disubstituted by R_{13} , while the substituents may be identical or different and

R_{13} denotes a fluorine, chlorine, bromine or iodine atom, a C_{1-2} -alkyl, trifluoromethyl or C_{1-2} -alkoxy group or

two groups R_{13} , if they are bound to adjacent carbon atoms, together denote a C_{3-4} -alkylene, methylenedioxy or 1,3-butadien-1,4-ylene group,

the tautomers, the stereoisomers and the salts thereof.

15. Bicyclic heterocycles of general formula I according to claim 12, wherein

R_a to R_d , A to C and X are defined as in claim 4,

D together with E denotes a hydrogen atom or a methyl group,

F denotes an $-O-C_{1-4}$ -alkylene group, while the alkylene moiety is linked to the group G, or an oxygen atom, which may not be linked to a nitrogen atom of the group G, and

G denotes an R_6O-CO -alkylene- NR_5 group wherein the alkylene moiety, which is straight-chained and contains 1 or 2 carbon atoms, may additionally be substituted by a methyl group or by an R_6O-CO or R_6O-CO -methyl group, while R_5 and R_6 are defined as in claim 4,

a pyrrolidino or piperidino group which is substituted by an R_6O-CO or R_6O-CO -methyl group wherein R_6 is defined as in claim 4,

- 221 -

a pyrrolidino or piperidino group which is substituted by two R_6O-CO or R_6O-CO -methyl groups wherein R_6 is defined as in claim 4,

a piperazino group which is substituted in the 4 position by an $R_6O-CO-C_{1-4}$ -alkyl, bis- $(R_6O-CO)-C_{1-4}$ -alkyl or $(R_7O-PO-OR_8)-C_{1-2}$ -alkyl group wherein R_6 to R_8 are defined as in claim 4,

a piperidinyl group substituted in the 1 position by an $R_6O-CO-C_{1-2}$ -alkyl group wherein R_6 is defined as in claim 4,

the tautomers, the stereoisomers and the salts thereof.

16. Bicyclic heterocycles of general formula I according to at least one of claims 12 to 15, characterised in that R_b denotes one of the optionally substituted 1-phenyl-ethyl groups mentioned in the respective claim 12, 13, 14 or 15,

the tautomers, the stereoisomers and the salts thereof.

17. The following compounds of general formula I according to claim 1:

(a) 4-[(3-bromophenyl)amino]-7-(3-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(b) 4-[(3-bromophenyl)amino]-7-(3-{4-[3-(ethoxycarbonyl)propyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(c) 4-[(3-bromophenyl)amino]-7-({1-[(ethoxycarbonyl)methyl]-piperidin-4-yl}oxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(d) 4-[(3-bromophenyl)amino]-7-(3-{4-[(diethoxyphosphoryl)methyl]-piperazin-1-yl}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

- 222 -

(e) 4-[(3-bromophenyl)amino]-7-(3-{N-[(ethoxycarbonyl)methyl]-N-methylamino}propyloxy)-6-[(vinylcarbonyl)amino]-quinazoline,

(f) 4-[(3-bromophenyl)amino]-6-[4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinazoline,

(g) 4-[(3-bromophenyl)amino]-6-[4-{N-[(diethoxyphosphoryl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline,

(h) (R)-4-[(1-phenylethyl)amino]-6-[4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-7-methoxy-quinazoline,

(i) 4-[(3-bromophenyl)amino]-6-({4-[N-(2,2-dimethoxyethyl)-N-methylamino]-1-oxo-2-buten-1-yl}amino)-7-methoxy-quinazoline,

(j) 4-[(3-bromophenyl)amino]-6-{[4-(2-ethoxy-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-methoxy-quinazoline,

(k) 4-[(3-bromophenyl)amino]-3-cyano-6-[4-{N-[(ethoxycarbonyl)methyl]-N-methylamino}-1-oxo-2-buten-1-yl)amino]-quinoline,

(l) 4-[(3-chloro-4-fluorophenyl)amino]-6-[4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,

(m) 4-[(3-chloro-4-fluorophenyl)amino]-6-[4-{N-[2-(ethoxycarbonyl)-ethyl]-N-[(ethoxycarbonyl)methyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,

(n) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline,

- 223 -

(o) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-cyclobutyloxy-quinazoline,

(p) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{4-[(ethoxycarbonyl)methyl]-piperazin-1-yl}-1-oxo-2-buten-1-yl)amino]-7-(2-cyclopropylethoxy)-quinazoline,

(q) (S)-4-[(3-chloro-4-fluorophenyl)amino]-6-({4-[2-(methoxycarbonyl)-pyrrolidin-1-yl]-1-oxo-2-buten-1-yl}amino)-7-cyclopropylmethoxy-quinazoline,

(r) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)methyl]-N-[2-(acetylsulphonyl)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,

(s) 4-[(3-chloro-4-fluorophenyl)amino]-6-[(4-{N-[(ethoxycarbonyl)-methyl]-N-[2-(methylcarbonyloxy)ethyl]amino}-1-oxo-2-buten-1-yl)amino]-7-cyclopropylmethoxy-quinazoline,

(t) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(5,5-dimethyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline and

(u) 4-[(3-chloro-4-fluorophenyl)amino]-6-{[4-(5-methyl-2-oxo-morpholin-4-yl)-1-oxo-2-buten-1-yl]amino}-7-cyclopropylmethoxy-quinazoline

and the salts thereof.

18. Physiologically acceptable salts of the compounds according to at least one of claims 1 to 17 with inorganic or organic acids or bases.

19. Pharmaceutical compositions containing a compound according to at least one of claims 1 to 17 or a physiologically accep-

- 224 -

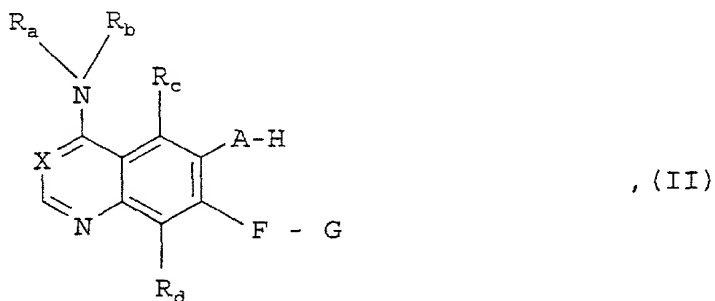
table salt according to claim 18 optionally together with one or more inert carriers and/or diluents.

20. Use of a compound according to at least one of claims 1 to 18 for preparing a pharmaceutical composition which is suitable for treating benign or malignant tumours, for preventing and treating diseases of the airways and lungs and for treating polyps, diseases of the gastrointestinal tract, the bile duct and gall bladder and also the kidneys and skin.

21. Process for preparing a pharmaceutical composition according to claim 19, characterised in that a compound according to at least one of claims 1 to 18 is incorporated in one or more inert carriers and/or diluents by a non-chemical method.

22. Process for preparing the compounds of general formula I according to claims 1 to 18, characterised in that

a) a compound of general formula



wherein

R_a to R_d , A, F, G and X are defined as in claims 1 to 17, is reacted with a compound of general formula

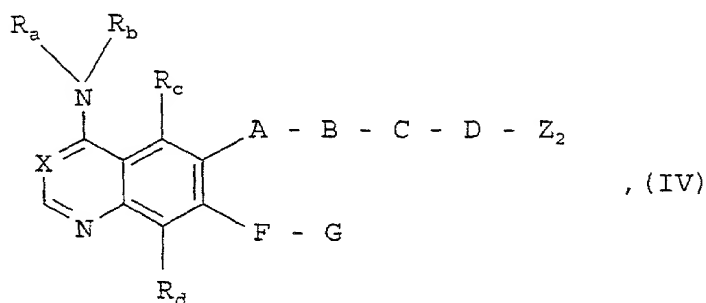


wherein

B to E are defined as in claims 1 to 17 and

Z_1 denotes a leaving group or a hydroxy group, or

b) in order to prepare compounds of general formula I wherein the group E is linked to the group D via a nitrogen atom, a compound of general formula



wherein

R_a to R_d, A to D, F, G and X are defined as in claims 1 to 17 and

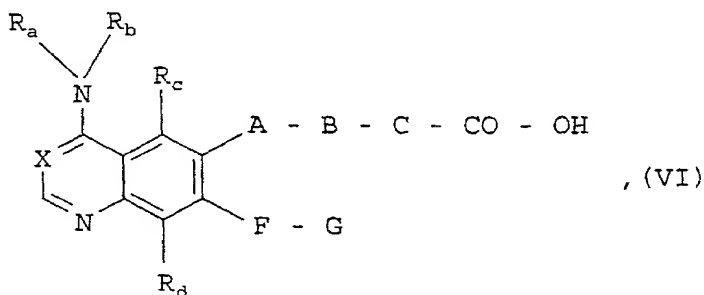
Z₂ denotes a leaving group or a hydroxy group, is reacted with a compound of general formula



wherein

Y denotes one of the groups mentioned for E in claims 1 to 17, which is linked to the group D via a nitrogen atom, or

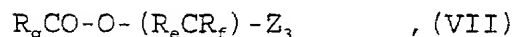
c) for preparing compounds of general formula I wherein D together with E denotes an R_gCO-O-(R_eCR_f)-O-CO- group, a compound of general formula



- 226 -

wherein

R_a to R_d , A to C, F, G and X are defined as in claims 1 to 17, is reacted with a compound of general formula

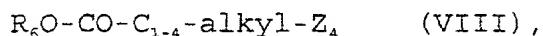


wherein

R_e to R_g are defined as in claims 1 to 17 and

Z_3 denotes a leaving group or

d) for preparing compounds of general formula I wherein E or G denotes a piperazino or homopiperazino group each substituted in position 4 by an $R_6O-CO-C_{1-4}$ -alkyl group wherein R_6 is defined as in claims 1 to 17, a corresponding compound containing a piperazino or homopiperazino group each unsubstituted in position 4 is reacted with a compound of general formula

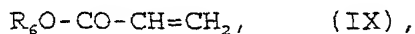


wherein

R_6 is defined as in claims 1 to 17 and

Z_4 denotes a leaving group, or

e) for preparing compounds of general formula I wherein E or G denotes a piperazino or homopiperazino group each substituted in position 4 by an $R_6O-CO-CH_2CH_2$ -group wherein R_6 is defined as in claims 1 to 17, a corresponding compound containing a piperazino or homopiperazino group each unsubstituted in position 4 is reacted with a compound of general formula

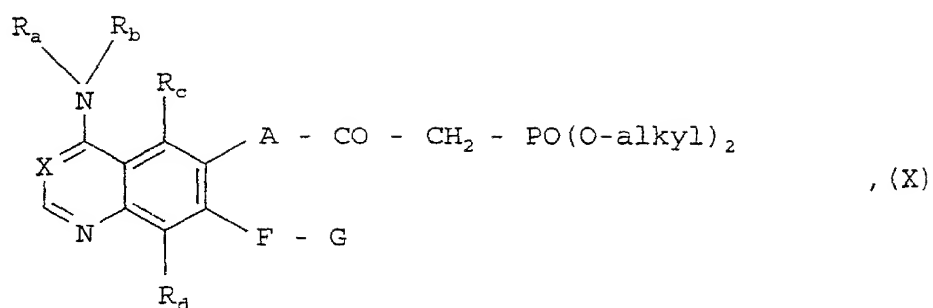


wherein

R_6 is defined as in claims 1 to 17, or

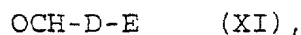
f) for preparing compounds of general formula I wherein C denotes a 1,2-vinylene group, a compound of general formula

- 227 -



wherein

R_a to R_d , A, F, G and X are defined as in claims 1 to 17 and alkyl denotes a lower alkyl group, is reacted with a compound of general formula



wherein

D and E are defined as in claims 1 to 17, and

if desired a compound of general formula I thus obtained which contains a hydroxy, amino, alkylamino or imino group is converted by acylation or sulphonylation into a corresponding acylamino, N-alkyl-acylamino, acyl-imino, sulphonyloxy, sulphonylamino, N-alkyl-sulphonylamino or sulphonyl-imino compound, whilst a sulphonyloxy compound thus obtained may be converted into a corresponding sulphenyl compound by reaction with an alkali metal salt of a thio compound, and/or

a compound of general formula I thus obtained which contains an amino, alkylamino or imino group is converted by alkylation or reductive alkylation into a corresponding alkyl compound of general formula I, and/or

a compound of general formula I thus obtained wherein E denotes a bis-[2,2-di-(C_{1-4} -alkoxy)ethyl]amino group may be converted by intramolecular cyclisation into a corresponding morpholino compound of general formula I, and/or

a compound of general formula I thus obtained wherein E or G denotes an optionally substituted N-(2-hydroxyethyl)-glycine or N-(2-hydroxyethyl)-glycine ester group may be converted by intramolecular cyclisation into a corresponding 2-oxo-morpholino compound, and/or

a compound of general formula I thus obtained which contains a carboxy or hydroxyphosphoryl group may be converted by alkylation into a corresponding ester of general formula I, and/or

if necessary any protecting group used during the reactions described above is cleaved again and/or

if desired a compound of general formula I thus obtained is resolved into the stereoisomers thereof and/or

a compound of general formula I thus obtained is converted into the salts thereof, particularly for pharmaceutical use into the physiologically acceptable salts thereof.

PTO/SB/01 (03-01)

Approved for use through 10/31/2002, OMB 0851-0032

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DECLARATION — Utility or Design Patent Application

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.									
NAME OF SOLE OR FIRST INVENTOR :				<input type="checkbox"/> A petition has been filed for this unsigned inventor					
Given Name (first and middle [if any])					Family Name or Surname				
Frank					HIMMELSBACH				
Inventor's Signature					Date				
<i>[Signature]</i>					Sept. 27, 01				
Residence: City			State		Country		Citizenship		
Mittelbiberach					Germany		DE		
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City			State		ZIP		Country		
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NAME OF SECOND INVENTOR:				<input type="checkbox"/> A petition has been filed for this unsigned inventor					
Given Name (first and middle [if any])					Family Name or Surname				
Elke					LANGKOPF				
Inventor's Signature					Date				
<i>[Signature]</i>					Oct. 25, 01				
Residence: City			State		Country		Citizenship		
Warthausen					Germany		DE		
Mailing Address					DEX				
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City			State		ZIP		Country		
Warthausen					D-88447		Germany		
<input checked="" type="checkbox"/> Additional inventors are being named on the <u>2</u> supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.									

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PTO/SB/02A (11-00)

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DECLARATION**ADDITIONAL INVENTOR(S)**

Supplemental Sheet

Page 1 of 2

Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
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Inventor's Signature <u>Birgit</u>		Date <u>Sept 27, 01</u>	
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Mailing Address <u>DEX</u>			
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Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
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<u>Thomas</u>		<u>METZ</u>	
Inventor's Signature		Date	
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Mailing Address <u>Schiffmuehlengasse 94/7/1</u>			
Mailing Address <u>AUX</u>			
City	<u>Vienna</u>	ZIP	<u>1220</u> Country <u>Austria</u>
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle (if any))		Family Name or Surname	
<u>Flavio</u>		<u>SOLCA</u>	
Inventor's Signature		Date	
Residence: City	<u>Vienna</u>	Country	<u>Austria</u> Citizenship <u>CH</u>
Mailing Address <u>Fimblingergasse 1/9</u>			
Mailing Address <u>AUX</u>			
City	<u>Vienna</u>	ZIP	<u>1230</u> Country <u>Austria</u>

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Case No. 5/1252

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DECLARATION**ADDITIONAL INVENTOR(S)**
Supplemental Sheet
Page 2 of 2

Name of Additional Joint Inventor, if any:

☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])

Family Name or Surname

Stefan

BLECH

Inventor's
Signature

Date

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Signature

Date

Residence: City

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Name of Additional Joint Inventor, if any:

☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])

Family Name or Surname

Inventor's
Signature

Date

Residence: City

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State

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**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

☐ Declaration Submitted with Initial Filing **OR** ☒ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	5/1252
First Named Inventor	Frank HIMMELSBACH
COMPLETE IF KNOWN	
Application Number	09 / 914,323
Filing Date	08/24/2001
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**BICYCLIC HETEROCYCLES, PHARMACEUTICAL COMPOSITIONS CONTAINING THESE
COMPOUNDS, THEIR USE AND PROCESSES FOR PREPARING THEM**

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) 08/24/2001

as United States Application Number or PCT International

Application Number 09/914,323 and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
DE 199 08 567.6	Germany	02/27/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DE 199 11 366.1	Germany	03/15/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DE 199 28 306.0	Germany	06/21/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DE 199 54 816.1	Germany	11/13/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR :

☐ A petition has been filed for this unsigned inventorGiven Name
(first and middle [if any]) FrankFamily Name
or Surname HIMMELSBACHInventor's
Signature

Date

Residence: City Mittlbiberach

State

Country Germany

Citizenship DE

Mailing Address Ahornweg 16

City Mittlbiberach

State

ZIP D-88441

Country Germany

NAME OF SECOND INVENTOR:

☐ A petition has been filed for this unsigned inventorGiven Name
(first and middle [if any]) ElkeFamily Name
or Surname LANGKOPFInventor's
Signature

Date

Residence: City Warthausen

State

Country Germany

Citizenship DE

Mailing Address Schloss 3

City Warthausen

State

ZIP D-88447

Country Germany

☒ Additional inventors are being named on the 2 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.

Please type a plus sign (+) inside this box → ☐

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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 1 of 2

Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Birgit		JUNG	
Inventor's Signature		Date	
Residence: City Schwabenheim		State	Country Germany
			Citizenship DE
Mailing Address Muehlstrasse 23			
Mailing Address			
City Schwabenheim		State	ZIP D-55270
			Country Germany
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Thomas		METZ	
Inventor's Signature		Date	
Thomas Metz		30.10.01	
Residence: City Vienna		State	Country Austria
			Citizenship DE
Mailing Address Schiffmuehlengasse 94/7/1			
Mailing Address			
City Vienna		State	ZIP 1220
			Country Austria
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Flavio		SOLCA	
Inventor's Signature		Date	
Flavio Solca		30.10.2001	
Residence: City Vienna		State	Country Austria
			Citizenship CH
Mailing Address Fimbingergasse 1/9			
Mailing Address			
City Vienna		State	ZIP 1230
			Country Austria

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Case No. 5/1252

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Page 2 of 2

Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Stefan		BLECH	
Inventor's Signature		Date	
Residence: City Warhausen	State	Country Germany	Citizenship DE
Mailing Address Muellerweg 9			
Mailing Address			
City Warhausen	State	ZIP D-88447	Country Germany
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
Mailing Address			
City	State	ZIP	Country
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Given Name (first and middle [if any])		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
Mailing Address			
City	State	ZIP	Country

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☐ Declaration Submitted with Initial Filing OR ☒ Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number 5/1262
First Named Inventor Frank HIMMELSBACH
COMPLETE IF KNOWN
Application Number 09 / 914,323
Filing Date 08/24/2001
Group Art Unit
Examiner Name

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

BICYCLIC HETEROCYCLES, PHARMACEUTICAL COMPOSITIONS CONTAINING THESE
COMPOUNDS, THEIR USE AND PROCESSES FOR PREPARING THEM

(Title of the Invention)

the specification of which

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) 08/24/2001

as United States Application Number or PCT International

Application Number 09/914,323 and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
DE 199 08 567.6	Germany	02/27/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DE 199 11 366.1	Germany	03/15/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DE 199 28 306.0	Germany	06/21/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

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Telefax**Boehringer
Ingelheim**

Ms. Tammy Holland
United States Patent and Trademark Office
703/305-5483
703/305-3230

Boehringer Ingelheim
Corporation

Page 1 of 5

February 06, 2002

Re: USSN 09/914,323; Atty. Docket No. 5/1252

Sandra J. Moline
Telephone 203/798-4791
Telefax 203/798-4408
E-Mail
smoline@rdg.boehringer-
ingelheim.com

Dear Ms. Holland:

Enclosed herewith please find a copy of the second Declaration for Utility or Design Patent Application which was inadvertently not included in the filing of the Missing Parts on November 9, 2001.

900 Ridgebury Rd/P.O. Box 368
Ridgefield, CT 06877-0368

If you need any further information, please call me at 203/798-4791.

Sincerely,

Sandra J. Moline
Administrative Assistant to
Alan R. Stempel

Enclosure

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63) <input type="checkbox"/> Declaration Submitted with Initial Filing OR <input checked="" type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)	Attorney Docket Number	5/1252
	First Named Inventor	Frank HIMMELSBACH
	COMPLETE IF KNOWN	
	Application Number	09 / 914,323
	Filing Date	08/24/2001
	Group Art Unit	
	Examiner Name	

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(Title of the Invention)

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NAME OF SOLE OR FIRST INVENTOR :



A petition has been filed for this unsigned inventor

Given Name
(first and middle [if any]) FrankFamily Name
or Surname HIMMELSBACHInventor's
Signature

Date

Residence: City Mittelbiberach

State

Country Germany

Citizenship DE

Mailing Address Ahornweg 16

City Mittelbiberach

State

ZIP D-88441

Country Germany

NAME OF SECOND INVENTOR:



A petition has been filed for this unsigned inventor

Given Name
(first and middle [if any]) ElkeFamily Name
or Surname LANGKOPFInventor's
Signature

Date

Residence: City Warthausen

State

Country Germany

Citizenship DE

Mailing Address Schloss 3

City Warthausen

State

ZIP D-88447

Country Germany

☒ Additional inventors are being named on the 2 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.

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Page 1 of 2

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Given Name (first and middle [if any])		Family Name or Surname	
Birgit		JUNG	
Inventor's Signature		Date	
Residence: City	Schwabenheim	State	Country Germany
		Citizenship	DE
Mailing Address Muehlstrasse 23			
Mailing Address			
City	Schwabenheim	State	ZIP D-55270
		Country	Germany
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Thomas		METZ	
Inventor's Signature <i>Thomas Metz</i>		Date 30.10.01	
Residence: City	Vienna	State	Country Austria
		Citizenship	DE
Mailing Address Schiffmuehlengasse 94/7/1			
Mailing Address			
City	Vienna	State	ZIP 1220
		Country	Austria
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Flavio		SOLCA	
Inventor's Signature <i>[Signature]</i>		Date 30.10.2001	
Residence: City	Vienna	State	Country Austria
		Citizenship	CH
Mailing Address Fimbingergasse 1/9			
Mailing Address			
City	Vienna	State	ZIP 1230
		Country	Austria

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Stefan		BLECH	
Inventor's Signature		Date	
Residence: City Warthausen	State	Country Germany	Citizenship DE
Mailing Address Muellerweg 9			
Mailing Address			
City Warthausen	State	ZIP D-88447	Country Germany
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Inventor's Signature		Date	
Residence: City	State	Country	Citizenship
Mailing Address			
Mailing Address			
City	State	ZIP	Country
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Inventor's Signature		Date	
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Mailing Address			
Mailing Address			
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